PRACTICAL RECEIPTS

FOR

THE MANUFACTURER, THE MECHANIC

AND FOR HOME USE

DR. H. R. BERKELEY & W. M. WALKER

Rev. Thomas
1912.

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BY

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NEW IMPRESSION

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EXPLANATION

OF

THE CHEMICAL TERMS USED IN THIS WORK.

Acetic Acid	Vinegar.
Acetate of Lead	Sugar of Lead.
Alcohol	Spirits of Wine.
Ammonia	Spirits of Hartshorn.
Bitartrate of Potass	Cream of Tartar.
Carbonate of Potass	Pearlash.
Cyanide of Iron	Prussian Blue.
Chlorine	Aqua Regia.
Nitrate of Silver	Lunar Caustic.
Nitric Acid	Aqua-fortis.
Sulphate of Copper	Blue Vitriol.
Sulphuric Acid	Vitriol.
Sulphate of Iron	Green Copperas.
Sulphate of Lime	Gypsum.
Sulphate of Magnesia	Epsom Salts.
Sulphate of Zinc	White Copperas.
Sub-acetate of Copper	Verdigris.
Sub-borate of Soda	Borax.
Superoxalate of Potass	Salts of Sorrel.
Sub-nitrate of Bismuth	Flake White.

PRACTICAL RECEIPTS.

PRELIMINARY CHAT WITH OUR READERS.

THIS collection of practically tested formulas contains a selection of the most valuable and reliable receipts ever published. Nearly all have been practically tested, and every minute detail is given and simply explained.

The Authors do not profess to make anything and everything, but only to treat upon those things which are indispensable. The book is written as one of reference for the Artist, Chemist, Manufacturer, Student and the Operative, in applying science reduced to practice in the affairs of their daily life.

This book should, consequently, be in the possession of all persons interested in professions and trades, in all parts where English is spoken.

The Authors, however, have no intention of affecting to teach any of their readers their own trades from beginning to end better than they themselves know them, but only to supply them with a useful book of receipts in their lines of work that can be resorted to in a moment, and serve as a kind of permanent referee to assure them that, in the pressure of daily work, their memories have not played

them the trick of forgetting the proportions of ingredients in the mixing or blending of some compound they wish to make and use. All who are engaged in the pressure of productive business know how often memory lets slip those proportions, and that frequently an error in one component may lead to serious loss in the failure to attain the desired results in the article to be made, before the error is discovered.

To enable such losses to be avoided, and to relieve the mental strain that too large a trust to memory imposes, is the Authors' object in presenting to the public this collection of formulas or receipts for practical men.

The lamented death of Dr. Berkeley when the manuscript was still uncompleted led to considerable delay in the publication of this work, but Mr. Walker, the surviving Author, was fortunately able to secure the collaboration of the well-known chemical expert Mr. Farrar Fenton, to whom are due the greatest thanks for the many valuable original receipts he has furnished, and also for his careful revision of the proofs while the book was passing through the press.

THE PUBLISHERS.

VARNISH-MAKING.

Many people profess and have tried to make varnish, and few have succeeded from want of acquaintance with the proper details. But if the reader will carry out our instructions, he will never experience an unsatisfactory result.

Mastic Picture-Varnish.

Gum mastic	2½ lb.
Turpentine	1 gall.

Map-Varnishes.

No. 1.—Gum dammar	5 lb.
Turpentine	1 gall.
No. 2.—Gum dammar	2½ lb.
Gum mastic	2½ lb.
Turpentine	1 gall.

In the two above alternative formulas, the turpentine should be put into a can or bottle, which has been previously dried thoroughly and freed from all moisture. (This appertains to all varnishes, otherwise they will bloom or become cloudy.)

The gum or gums should then be added to the turpentine, and the vessel securely fastened down and agitated, which facilitates the dissolving, and then be allowed to stand until the gums are clarified. To make in quantities a churn may be used to great advantage.

Another formula—

Canada balsam	4 oz.
Turpentine	4 gall.

Russet Cream.

Beeswax	2 oz.
White wax	1 oz.
Turpentine	6 oz.

Let the above stand in a jar a few days, until dissolved. Then take castile soap ¼ oz., boiling water 1 oz., and dissolve, and mix with the above compound, and colour to the shade required with a little turmeric.

To Make Leather Waterproof.

Paraffin wax	1½ oz.
Paraffin oil	1 pint

Let these stand one week, or until dissolved, then apply it to the leather.

Black Enamel for Leather.

Gold size	2 oz.
Eucalyptus oil	10 drops
Turpentine	1 drm.

Ivory or drop black to thickness required.
Mix together, and agitate till combined.
Varnishes are like wine, they improve with age.

Spirit Paper Varnishes.

No. 1.—Gum manilla copal soft . .	4 lb.
Gum sandrac	2 lb.
Methylated spirit (64) . .	1 gall.
No. 2.—Gum manilla copal soft . .	5 lb.
Gum mastic	1 lb.
Methylated spirit (64) . .	1 gall.

A Very Superior Varnish for the same use.

Gum manilla copal soft . .	5 lb.
Gum sandrac	2 lb.
Oil of lavender	1 oz.
Methylated spirit . . .	1 gall.

Turpentine Varnish.

Pale resin	10 lb.
Turpentine	1 gall.

Dissolve cold.

Oak Varnish.

Gum copal	3 lb.
Drying oil	½ gall.

Melt together, then remove from the fire, and add 3 pints of warm turpentine.

Copal Varnish.

Fuse or melt pale hard copal	2 lb.
Hot drying oil	1 pint
Warm turpentine	2 pints

Wood Varnish.

Button lac	4 lb.
Shellac (orange)	3 lb.
Methylated	1 gall.

French Polish. (Two formulas.)

No. 1.—Shellac	1 lb.
Button lac	2 lb.
Seed lac	½ lb.
Methylated spirit	1 gall.

No. 2.—Methylated spirit	1 gall.
Button lac	2 lb.
Gum benjamin	½ lb.
Shellac (orange)	1 lb.

The gum benjamin must be dissolved separately, and added afterwards when perfectly cleared from dirt or chips.

White Enamel Varnish.

Canada balsam	10 lb.
Turpentine	10 lb.

Grind the above along with white lead, or oxide of zinc, until the thickness required is attained. Any pigment colours may be used instead of the lead or zinc.

To Clarify Oil for Varnish-Making.

Heat in a copper boiler 50 gall. of linseed oil, which should be perfectly free from resin oil, to 180° F., and add 2½ lb. of vitriol; keep the oil at the above temperature for half an hour, then remove it from the fire, and in 30 hours decant off the oil and let it stand for a few weeks to clear.

Brunswick Black.

Asphaltum (the Egyptian) .	1½ oz.
Double-boiled linseed oil . .	2 qrt.
Turkey umber	¼ oz.

Heat together till the whole is incorporated; take from the fire, and add as much oil of turpentine and ivory black as will bring it to the desired consistence. But be careful that the compound does not take fire by being over-heated.

Glove Glazing Varnish.

The white of an egg (albumen) beaten up to a froth in twice its weight of water, and 2 drm. of chloride of sodium or common salt added; the tread and the yolk should be taken out before being beaten up.

Black Kid or Leather Lustre.

Methylated spirit . . .	1 qrt.
Gum rubrum or gum lac . .	½ lb.

Dissolve and strain, and add castile soap 1 oz. Dissolve in a pint of methylated spirit and add 1½ oz. of glycerine, and colour with black aniline, etc.

Glaze for Linen Handkerchiefs.

Used largely by all the linen manufacturers in Ireland.

Russian tallow	1 lb.
White wax	1 oz.

Melt this in an enamelled pan at a low heat, then add 8 oz. of olive oil, and add gradually, while con-

stantly stirring, ½ to 1 oz. of 880 spirit of ammonia. Mix 1 lb. of this composition to 12 lb. of watery starch. This elegant preparation gives a spring and elasticity to linen fabrics upon which it is used.

Gold-Embossing Varnish.

This compound is sold for 4*s.* per lb., and is very largely used; it can be made for 6*d.* per lb. A superior quality can be obtained by using a higher priced gum for 8*d.* per lb.

Take gum dammar 1 lb., powder it very fine, and add ¼ oz. of manilla copal gum; powder, very fine, and sift it through a very fine muslin, so as to avoid granules before using.

Black Bronze for Brass.

Brush the brass with a diluted solution of nitrate of mercury, and then several times with a solution of sulphur, and afterwards apply a compound of

Manganate of iron . . .	½ oz.
Arsenic	¼ oz.
Sulphuric acid	1 oz.

Mix, and keep ready for use.

To Silver Brass.

Nitrate of silver . . .	1 drm.
Common salt	2 drm.
Whiting	2 drm.
Cream of tartar . . .	1 drm.

Mix with water; and rub on the metal with brush, rag, or leather.

Black Finish for Brass.

Take nitrate of silver 1 drm., and dissolve it in water 1 oz. Then take nitric acid 1 oz.; pure copper 2 drm.; and dissolve together. Mix the two solutions, and plunge the brass in them for a moment; afterwards heat the brass until the shade of black required is obtained.

Preparative Liquid Varnish for Coating Marble, Glass or Stone, previous to engraving on them by acids.

Asphaltum (pure Egyptian)	1 oz.
Beeswax	1 oz.
Turpentine	6 oz.

Dissolve.

Coat the marble with the above composition. When perfectly dry, print from a perforated stencil plate the inscription desired in red chalk and water. Then again apply the stencil plates, and rub away the composition from the red-chalked letters down to the clear marble with a wire brush, and etch the cleared surface down with nitric acid (mixed 3 parts acid to 1 of water) and when eaten deep enough neutralise the acid by a soda wash.

A Picture-Varnish.

Gum sandarac	1 oz.
Manilla copal	3 oz.
Methylated spirit	8 oz.

Dissolve the gums in the spirit, and add a few drops of oil of lavender.

French Polishes.

No. 1.—Gum sandarac	14 oz. 2 drm.
Gum mastic in drops	7 oz. 2 drm.
Shellac (the yellower the better)	14 oz. 2 drm.
Alcohol of 0·8295 specific gravity	3 qrt. 1 pint
No. 2.—Orange shellac	12 oz.
Benzoin	1 oz.
Sandarac	1 oz.
Methylated spirits	½ gall.
No. 3.—Shellac	14 oz.
Sandarac	¾ oz.
White resin	¾ oz.
Benzoin	¾ oz.
Gum thus	¾ oz.
O. P. finishing spirit	½ gall.

Glazing Varnish.

Glaze is known to the trade under several names, such as slake, finish and telegraph; it is used only for cheap work, when economy of time is a consideration, and is made as follows:—

Mastic	1 oz.
Benzoin	5 oz.
Methylated spirit	5 gills

Stencilling Varnish.

An imitation of marqueterie on light-coloured woods can be obtained by the following method: Cut a stencil pattern in stout cartridge paper (this is best done upon a piece of glass with the point of a sharp penknife), and place it on the centre of a panel or wherever required, and have ready some gas black mixed with thin polish; apply this with a camel-hair pencil over the cut-out pattern, and when it is removed finish the lines and touch up with a finer tool. The work should be first bodied in, and when the pattern is dry, rubbed down with a piece of hair cloth (the smooth side down) or a cork rubber to a smooth surface, after which the polishing can be proceeded with until finished. Upon oak this will have the appearance of inlaid work.

Varnishes for Furniture.

Methylated spirit	1 gall.
Shellac	40 oz.
Resin	4 oz.
Benzoin	5 oz.
Sandarac	2 oz.
White resin	2 oz.

The brown-hard varnish which is used at the present time is made differently, and produces a better result; it is made from the following:—

Methylated spirit	1 gall.
Shellac	32 oz.
Rosin	8 oz.
Benzoin	8 oz.

White Varnish.

The white-hard or transparent varnish for white wood is made with

Methylated spirit . . .	1 gall.
Bleached shellac . . .	32 oz.
Gum sandarac . . .	24 oz.

In making either polishes or varnishes, all the gums should be first pounded and reduced to powder before mixing with the spirit, and when mixed they should be occasionally well shaken or stirred, so as to hasten their dissolution.

Remarks on Polishing.

Amateurs at French polishing will be more successful on a large surface than a small one.

When polishing, the rubber cloth should be changed occasionally, or the brightness will not remain when finished.

A most efficacious improver of many kinds of woods is raw linseed oil mixed with a little rectified spirits of turpentine.

French polish can be tinted a light red with alkanet root, and a dark red with Bismarck brown.

A good Turkey sponge is capable of spreading either stain or varnish more smoothly than a camel's-hair brush on a flat surface.

The sub-nitrate of bismuth is beginning to supersede oxalic acid for bleaching processes.

FILLERS FOR WOOD STAINING.

Basic Japan.

Japan of the Best Quality.

Put ¾ lb. gum shellac into 1 gall. linseed oil; take ½ lb. each of litharge, burnt umber and red lead, also 6 oz. sugar of lead. Boil in the mixture of shellac and oil until all are dissolved; this will

require about four hours. Remove from the fire, and stir in 1 gall. of spirits of turpentine, and the work is finished.

For Oak Wood.

Whiting	5 lb.
Calcined plaster	2 lb.
Dry burnt sienna	1 oz.
Dry French yellow	½ oz.
Raw linseed oil	1 qrt.
Benzine spirits	1 pint
White shellac.	½ pint

Mix well, apply with brush, rub in with excelsior or tow, and clean off with rags.

Fillings for Light Woods.

Whiting	5 lb.
Calcined plaster (plaster of Paris)	3 lb.
Raw linseed oil	½ gall.
Spirits of turpentine	1 qrt.
Brown japan	1 qrt.
A little French yellow to tinge the white.	

Mix well and apply with a brush, rub it in with excelsior or tow, and clean off with rags. This thoroughly fills the pores of the wood and preserves its natural colour.

Another for Light Woods.

Whiting	10 lb.
Calcined plaster	5 lb.
Corn starch	1 lb.
Calcined magnesia	3 oz.
Raw linseed oil	1 gall.
Spirits of turpentine	½ gall.
Brown japan	1 qrt.
French yellow	2 oz.

Mix well and apply with a brush, rub in well with excelsior or tow, and clean off with rags.

For Mahogany or Cherry Wood.

Whiting	5 lb.
Calcined plaster	2 lb.
Dry burnt sienna	1½ oz.
Venetian red	1 oz.
Boiled linseed oil	1 qrt.
Spirits of turpentine	1 pint
Brown japan	1 pint

Mix well, apply with a brush, and rub well in with excelsior or tow; clean off with dry rags.

For Rosewood.

Fine whiting	6 lb.
Calcined plaster	2 lb.
Rose-pink	1 lb.
Venetian red	2 oz.
Vandyke brown	½ lb.
Brandon red	½ lb.
Boiled linseed oil	1 gall.
Spirits of turpentine	½ gall.
Black japan	1 qrt.

Mix well together, apply with brush, rub well in with tow, and clean off with rags.

For Black Walnut.

For medium and cheap work.

Whiting	10 lb.
Dry burnt umber	3 lb.
Vandyke brown	4 lb.
Calcined plaster	3 lb.
Venetian red	½ lb.
Boiled linseed oil	1 gall.
Spirits of turpentine	½ gall.
Black japan	1 qrt.

Mix well and apply with a brush, rub well with excelsior or tow, and clean off with rags.

A Varnish Polish.

Gum shellac	10 oz.
Gum sandarach . . .	1 oz.
Venice turpentine . . .	1 drm.
Alcohol	1 gall.

Put the mixture into a jug for a day or two, shaking occasionally. When dissolved it is ready for use. Apply a few coats. Polish by rubbing smooth.

For the commonest kind of work in black walnut a very cheap polish can be made in the following manner :—

Turpentine	1 gall.
Pulverised asphaltum . .	2 lb.
Boiled linseed oil . . .	1 qrt.
Venetian red	2 oz.

Put the mixture in a warm place and shake occasionally. When it is dissolved, strain and apply to the wood with a stiff brush. Rub well with cloth when dry. Then take 1 pint of thin shellac varnish, ½ pint boiled linseed oil. Shake them well before using. Apply with cloth, rubbing briskly, and you will have a fine polish.

Waterproof French Polish.

Gum benjamin . . .	2 oz.
Gum sandarac . . .	½ oz.
Gum anime	½ oz.
Gum benzoin	1½ oz.
Alcohol	1 pint

Mix in a closely stoppered bottle, and put in a warm place till the gums are well dissolved. Then strain off, and add ¼ gill of poppy oil. Shake well together, and it is ready for use.

A Varnish for Musical Instruments.

Alcohol	1 gall.
Gum sandarac	1 lb.
Gum mastic	½ lb.
Best white resin	2 lb.
Gum benzoin	3 lb.

Cut the gums into strips with the alcohol. When they are thoroughly dissolved, strain the mixture through fine muslin, and bottle for use; keep the bottle tightly corked. This is a beautiful varnish for violins and other musical instruments of wood, and for fancy articles, such as those of inlaid work. It is also well adapted for panel work and all kinds of cabinet furniture. There is required only one flowing coat, and it produces a very fine mirror-like surface. Apply this varnish with a flat camel's-hair or sable brush. In an hour after application the surface is perfectly dry.

French Varnish for Cabinet-work.

Shellac	1½ oz.
Gum mastic	½ oz.
Gum sandarac	½ oz.
Spirit of wine by weight	20 oz.

The gums to be first dissolved in the spirit, and lastly the shellac. This may be best effected by means of the water bath. Place a loosely corked bottle containing the mixture in a vessel of warm water of a temperature below the boiling point, and let it remain until the gums are dissolved. Should evaporation take place, an equal quantity to the spirit of wine so lost must be replaced till the mixture settles, then pour off the clear liquid for use, leaving the impurities behind; but do not filter it. Greater hardness may be given to the varnish by increasing the quantity of shellac, which may be done to the amount of one-twelfth of the lac to

eleven-twelfths of spirit. But in this latter proportion the varnish loses its transparency in some degree, and must be laid on in very small quantities at a time.

Cheap Varnish for Wood.

Dissolve copal gum, broken in pieces, in linseed oil, by digestion; the heat being almost sufficient to boil the oil. The oil should be made drying by the addition of quicklime. This makes a beautiful transparent varnish. It should be diluted, if too thick, with oil of turpentine.

Black Varnish for Wood or Canvas.

Spirits of turpentine . .	1 gall.
Asphaltum	2¼ lb.

Put them into an iron kettle on a stove, and dissolve the gum by heat. When it is dissolved and a little cool, add 1 pint copal varnish and 1 pint boiled linseed oil. When entirely cool it is ready for use. For a perfect black add a little lamp-black.

Seedlac Varnish.

Wash 3 oz. of seedlac in several waters; dry it and powder it coarsely. Dissolve it in 1 pint of rectified spirits of wine; submit it to gentle heat, shaking it as often as convenient until it appears dissolved. Pour off the clear part, and strain the remainder.

Varnish for Tools.

Tallow	2 oz.
Resin	1 oz.

Melt together, and strain while hot to remove the specks which are in the resin. Apply a slight coat on the tools with a brush, and it will keep off the rust for any length of time.

Varnish for Iron.

Pulverised gum asphaltum	2 lb.
Gum benzoin	¼ lb.
Spirits of turpentine	1 gall.

To make this varnish quickly, keep in a warm place, and shake often until it is dissolved. Shade to suit with finely ground ivory black. Apply with a brush. This varnish should be used on ironwork exposed to the weather. It is also well adapted for inside work, such as iron furniture, where a handsome polish is desired.

Rosewood Stain.

Logwood chips	1 lb.
Red-sanders	½ lb.
Water	½ gall.

Boil over a fire until the full strength is obtained. Apply the mixture, while hot, to the wood with a brush. Use one or two coats to obtain a strong red colour. Then take 1 gall. of spirits of turpentine and 2 lb. of asphaltum. Dissolve in an iron kettle on a stove, stirring constantly. Paint with a grainer's brush upon the red stained surface the necessary black hair shadings to imitate rosewood. To make a perfect black, add a little lampblack. The addition of a small quantity of varnish with the turpentine will improve it. This stain applied to birchwood gives as good an imitation of rosewood as on black walnut, the shade on the birch being a little brighter.

Cheap Stain for the Sap of Black Walnut.

Strong vinegar	1 gall.
Dry burnt umber	1 lb.
Fine rose-pink	½ lb.
Dry burnt Vandyke brown	½ lb.

Put them into a jug and mix them well ; let the mixture stand one day, and it will then be ready for use. Apply this stain to the sap with a piece of fine

sponge; it will dry in half an hour. The whole piece is then ready for the filling process. When completed, the stained part cannot be detected even by those who have performed the work. This recipe is of value, as by it wood of poor quality and mostly of sap can be used with good effect.

Hair-cloth Reviver.

Mix equal parts of marrow oil (neats-foot), ox-gall and ivory black. To be well rubbed in with a cloth. This composition forms a valuable renovator for old hair cloth.

Morocco Leather Reviver.

The coverings of chairs or sofas in morocco, roan or skiver can be much improved by this reviver. If old and greasy, wash with sour milk first. The reviver should be applied with a piece of wadding, and wiped one way only, as in glazing. The colour can be matched by adding red-sanders.

Methylated spirit . . .	½ pint
Gum benzoin	2 oz.
Shellac	½ oz.

Mix, and shake up occasionally until dissolved.

POLISHES.

A French Polish for Carved Work in Furniture.

Shellac	30 parts
Gum arabic	7 parts
Copal	15 parts
Spirits of wine . . .	700 parts

Moody's Polish.

Shellac	1½ part
Gum benzoin	½ part
Dragon's blood* . . .	$1\frac{1}{15}$ part
Rectified wood spirit (acetone)	8 parts

* To deepen the colour (this need not be added unless desired).

Dissolve the ingredients in the spirit by standing the vessel in a warm place, or by the gentle heat of a sand bath, and filter the solution through half worn-out flannel.

Ordinary Cabinet-maker's Polish for Dark Woods, such as Walnut, Mahogany, etc.

Ruby shellac	1 part
Spirits of wine	4 parts

Digest the shellac in the spirit.

Renovating Polish for Fine Carved Work.

Linseed oil	8 oz.
Old ale	8 oz.
Egg	1 white of
Hydrochloric acid	1 oz.
Spirits of wine	1 oz.

Mix, and let digest until all are thoroughly incorporated.

Polish for Darkening Furniture.

No. 1.—Linseed oil	1 pint
Rose-pink	1 oz.
Alkanet root	1 oz.

Beat the pigment and dye-colour up in a mortar in the oil ; then let the mixture rest for a couple of days, and, when clear, pour off the oil, which will be found to be of a rich colour and ready for use.

No. 2.—Alkanet root	1 oz.
Shellac varnish	4 oz.
Turpentine	2 oz.
Scraped beeswax	2 oz.
Linseed oil	1 pint

Mix all together, and let them digest for fully a week.

Copal Polish.

Powdered gum copal	4 parts
Camphor	1 part
Ether	q.s.
Alcohol	q.s.

Melt the copal and camphor in the ether at a gentle heat to form a semi-fluid mass, and then digest with a sufficient quantity of alcohol.

Formulas for Furniture Creams or French Polishes.

No. 1.—Alcohol 90 per cent.	1 pint
Copal resin	¼ oz.
Gum-arabic	¼ oz.
Shellac	1 oz.

Pound up the resin and gum, and sift through a hair sieve. Then place the powder in a bottle with the spirit, and cork up tightly; shake it occasionally, and when the solution is complete—in about three days—strain through a piece of muslin as already described. Keep in a tightly corked bottle.

No. 2.—Shellac	6 oz.
Naphtha	1 qrt.
Gum benzoin	¾ oz.
Sandarac resin	1 oz.

Dissolve the solid ingredients in the spirit.

No. 3.—Shellac	1½ oz.
Sandarac	¼ oz.
Naphtha	½ pint

Dissolve the solids in the spirit. Make a pad of flannel, wet it well with the polish, then lay a piece of clean linen rag over the flannel, apply 1 drop of linseed oil, rub the work in a circular direction lightly at first. To finish off, use a little naphtha, applied the same as the polish.

No. 4.—Shellac . . . . . 9 oz.
Mastic . . . . . ¾ oz.
Sandarac . . . . . ¾ oz.
Spirits of wine . . . 1 qrt.
Copal varnish . . . . 1 gill

Dissolve the three solids in the spirit, and then add the copal varnish and thoroughly mix by agitation.

No. 5.—Shellac . . . . . 12 oz.
Wood naphtha . . . 1 qrt.
Linseed oil . . . . ½ pint

Dissolve the shellac in the naphtha, and then add the oil.

No. 6.—Shellac . . . . . 3 oz.
Mastic resin . . . . ½ oz.
Methylated spirit . . . 1 pint

Dissolve the solids.

No. 7.—Shellac . . . . . 5 oz.
Gum elemi . . . . ½ oz.
Gum copal . . . . ¾ oz.
Methylated spirit . . . 1 qrt.

Dissolve the resins in the spirit by digestion.

No. 8.—Shellac . . . . . 2½ oz.
Gum juniper . . . . 1 oz.
Gum benzoin . . . . 1 oz.
Methylated spirit . . . 1 pint

Dissolve.

No. 9.—Mastic resin . . . . 1 oz.
Sandarac resin . . . 1 oz.
Seedlac . . . . . 1 oz.
Sandarac . . . . . 1 oz.
Shellac . . . . . 1 oz.
Gum arabic . . . . 1 oz.
Virgin wax . . . . ¼ oz.
Methylated spirits of wine . 1 qrt.

Reduce the solids to powder, and then digest them in the spirit in a closed bottle for twelve hours, when it will be fit for use.

Imitation Polish for Woodwork.

Gelatine solution as a wash.	
Fluid copal varnish . .	2¼ lb.
Pure drying linseed oil . .	4 drm.
Ethereal solution of wax .	q.s.

Varnish the woodwork with the solution of gelatine, and after it has dried, and been smoothed by rubbing, apply the polish by a fine brush.

Vienna Polish.

Finest shellac	3¾ oz.
Alcohol 96 per cent. . .	17 oz.

Digest at a moderate temperature.

Polish for Wood, usable without Friction.

Best shellac	4 oz.
Strong alcohol . . .	1 qrt.
Linseed oil	1 qrt.
Spirits of turpentine . .	1 pint
Sulphuric ether (common ether)	4 oz.
Aqua ammonia . . .	4 oz.

Dissolve the shellac in the alcohol, then add the oil and turpentine, shake well together, and then add the ether and ammonia.

A Red Polish.

Beeswax	4 oz.
Alkanet powder . . .	4 drm.
Oil of turpentine . . .	16 oz.

Digest the alkanet in the turpentine until the fluid is sufficiently coloured, strain it, then scrape the beeswax fine, and thoroughly incorporate all the ingredients by digesting the mixture by the heat of a water bath.

If the alkanet be omitted a pale polish is obtained by this formula.

Polish for Wainscot.

Beeswax	q.s.
Alcohol 90 per cent. . .	q.s.

Take as much wax as will be sufficient for the work in hand, put it in a paint-pot, or other earthenware pan, and cover it with the alcohol and allow the wax to dissolve without the aid of heat; reduce it to the consistency of butter.

Formulas for Furniture Oils.

No. 1.—Linseed oil	1 pint
Spirits of turpentine . .	½ pint
Vinegar	½ pint

Mix all together.

No. 2.—Sandarac resin . . .	3 or 4 pieces*

* Each about as large as a walnut.

Boiled oil	1 pint
Venice turpentine . . .	1 drm.
Oil of turpentine (if needed) to thin the mixture.	

Powder the sandarac, and afterwards melt the powder in a dry earthenware pipkin, then add the oil, and boil together for one hour; while cooling, put in the Venice turpentine, and if too thick, add a little oil of turpentine to produce fluidity.

Compound for Cleaning and Repolishing Old Furniture.

White or yellow wax . .	2 oz.
Pure turpentine . . .	4 oz.

Place an earthenware pipkin over a moderate fire, and into it dip the wax, and when that is melted, add the turpentine (removing the vessel from the fire to prevent ignition of the vapour given

off by the turpentine becoming heated); stir the mixture until cool, when it is ready for use. The compound brings out the original colour of the wood, adding a lustre equal to that of varnish.

French Polish Reviver.

No. 1.—Linseed oil . . . . ½ pint
Camphor . . . . . 1 oz.
Vinegar . . . . . 2 oz.
Butter of antimony . . ½ oz.
Spirits of hartshorn . . ¼ oz.
Mix.

No. 2.—Vinegar . . . . . ½ gill
Spirits of wine . . . 1 gill
Linseed oil . . . . 1 drm.
Mix.

Pastes for Polishing or Finishing Wood to keep it Light in Colour.

No. 1.—Beeswax . . . . . 4 oz.
Turpentine . . . . 2 gills

Cut the beeswax up fine and digest.

If wished to darken the wood, add linseed oil to the above.

No. 2.—Yellow wax . . . . 5 oz.
Turpentine . . . . 1 pint
Castile soap . . . . 1½ oz.
Water . . . . . 2 oz.

Cut the wax into small pieces, and dissolve it in the turpentine by a gentle heat; dissolve the soap in the water, and when the turpentine and wax mixture is nearly cold, stir the whole together into a paste.

No. 3.—Beeswax . . . . . 12 oz.
Spirit of turpentine . . 1 qrt.
Common soap . . . . 4 oz.
Water . . . . . 1 qrt.

Dissolve the wax in the turpentine by putting it in a jar with a cover to it, and standing the jar in a saucepan of hot water (i.e. a water bath). Separately dissolve the soap in water, then mix the two fluids, and stir well together till nearly cold.

Spirit Varnish for Woodwork.

Sandarac	40 oz.
Venetian turpentine	4 oz.
Alcohol	12 oz.

Pliable Sandarac Lac Varnish for Wood.

Sandarac	13·12 oz.
Elemi	4·37 oz.
Anime	4·37 oz.
Camphor	1·05 oz.
Alcohol 90 per cent.	2¾ lb.

Dissolve the resins by pouring the alcohol over them, and digesting in a flask by the heat of a sand bath. Filter through a fine sieve or cloth.

Another Sandarac Varnish for Furniture.

Sandarac	13·12 oz.
Mastic	4·37 oz.
Powdered soluble glass	8¾ oz.
Alcohol 90 per cent.	·35 oz.
Venetian turpentine	2½ oz.

Powder the resins, and mix them with the glass, then dissolve in the alcohol by heat, and add the turpentine when the resins are dissolved. Filter through cotton-wool.

Another Polish for Black Oak.

Stearine	2½ lb.
Oil of turpentine	3½ lb.
Ivory or bone black	¼ oz.

Beat the stearine out into thin sheets with a wooden mallet, and mix it with the turpentine, after

which subject the mass to the heat of a water bath, and heat up ; when hot, put in the black pigment, at the same time stir well to prevent crystallisation. To cool the mixture, empty into another vessel, and stir until cold.

Warm the composition until it is reduced to the liquid state, and apply in small quantities with a cloth ; afterwards rub it well with a piece of silk or linen cloth to bring up the polish.

A General Polish.

Yellow wax	2½ oz.
White wax	1 oz.
Castile soap	1 oz.
Turpentine	10 oz.
Boiling water	10 oz.
Carbonate of potash	1 drm.

Melt the wax and turpentine together, dissolve the soap and potassic carbonate in the water, and mix while warm, stirring till cold.

Another for same use.

Yellow wax	16 oz.
Yellow soap	2 oz.
Spirit of turpentine	1 qrt.
Boiling water	1 qrt.

Melt the wax and soap over a slow fire, add the turpentine, and lastly stir in the water gently till it is quite cold.

For Wholesale Manufacture for a Similar Polish.

Shellac	6 lb.
High grade sulphuric ether	3½ oz.
Collodion cotton	3½ oz.
Camphor	1¾ oz.
Pure alcohol	4 to 5 gall.
Oil of rosemary	q.s.
Pure linseed oil	q.s.
Benzole	q.s.

Dissolve the shellac in the alcohol, separately dissolve the collodion in the ether, and add the camphor; stir thoroughly, and stir in enough alcohol of 96 per cent. to completely dissolve the cotton, then mix the two solutions together and shake well.

To prepare an oil for rubbing in the polish, dissolve as much camphor in rosemary oil as the latter fluid will dissolve, and mix $1\frac{3}{4}$ oz. of this mixture with 35 oz. of pure linseed oil. For a finish, dissolve benzole in alcohol and dilute at pleasure, taking care to apply the solution as weak as practicable.

Polish for Carved Work.

Seedlac	1 part
Transparent resin . . .	1 part
Spirits of wine . . .	9 parts

Dissolve the solids in the spirit by digestion for several hours, with frequent shakings.

Warm the article to be polished in front of a stove, also warm the polish, and then lay it on with a brush; avoid going over the same part more than twice, or the brush marks will show.

POLISHINGS FOR METALS.

Polishing Powder.

No. 1.—Carbonate of magnesia . .	5 parts
Carbonate of lime . . .	5 parts
Ferric oxide	$8\frac{3}{4}$ parts

Mix thoroughly, by sifting through a sieve.

No. 2.—Carbonate of magnesia . .	5 lb.
Colcothar (washed) . .	$6\frac{7}{8}$ oz.

Mix as before.

Polishing Paste for Nickel.

Chalk mixed with tallow.

Parisian Polishing Powder.

Jewellers' rouge	5 parts
Carbonate of magnesia	30 parts
Alcohol	q.s.

Mix into a paste with the spirit, and use wet, rubbing until the paste dries off.

Polishing Soaps.

No. 1.—Liquid cocoanut-oil soap	11½ parts
Tripoli	1 part
Alum	½ part
Tartaric acid	½ part
White lead	½ part

Stir all the ingredients into the fluid soap.

No. 2.—Cocoanut oil	40 parts
Potash lye of 38° to 40° strength	2 parts
Colcothar	5 parts
Water	5 parts
Spirits of sal-ammoniac	$\frac{1}{40}$th part

Stir the oil into the lye, and when bright, add the colcothar mixed up in the water, and finally add the spirit of sal-ammoniac to the whole mixture.

No. 3.—Cocoanut soap	11 lb.
Water	q.s.
Chalk	13¼ oz.
Alum	6½ oz.
Tartaric acid	6½ oz.
White lead*	6½ oz.

* *i.e.* carbonate of lead.

Cut up the soap into shavings, and melt in water; then add the other ingredients, and stir all together vigorously.

Plate Powders.

No. 1.—Sub-carbonate of iron } equal parts
Precipitated and prepared chalk }

No. 2.—Oxalate of iron calcined.

No. 3.—Calcined sulphate of iron, mixed with a little powdered chalk.

Polishing cloth.

No. 4.—Hartshorn powder . . . 2 oz.
Water . . . . . 1 pint

Boil the powder in the water; then soak small squares of damask cloth in the liquid; hang them up to dry and they will be ready for use, and better than many powders.

No. 5.—Prepared chalk . . . 8 oz.
Spirits of turpentine . . 2 oz.
Alcohol . . . . . 1 oz.
Spirits of camphor . . . ½ oz.
Aqua ammonia . . . 2 drm.

Add the chalk gradually to the mixture of turpentine, alcohol, spirits of camphor, and liquid ammonia.

Apply the mixture with a sponge, and polish off when it has dried.

No. 6.—Fine chalk . . . . 1 oz.
Cream of tartar . . . 2 oz.
Rotten stone . . . . 1 oz.
Red lead . . . . . 1 oz.
Alum . . . . . ¾ oz.

Pulverise together in a mortar.

Polishing Powder for Specula (Lord Ross's Formula).

Precipitate a dilute solution of sulphate of iron by ammonia in excess; wash the preciptate; press in screw-press until nearly dry, then expose to heat until it appears a dull red colour in the dark. Cool, and grind to a powder in a mill, and sift through fine corn-millers' silk.

Polish for Silver-plated Ware.

Potassic cyanide	¼ oz.
Argentic nitrate	5 grn.
Water	2 oz.

Dissolve the cyanide and nitrate in the water.

Apply with a soft brush, dry with a cloth and with a chamois skin.

Soaps for Silver.

Hard soap	8 oz.
Turpentine	1½ oz.
Water	4 oz.
Liquor ammonia	3 oz.

Mix the turpentine and water, and boil the soap down until perfectly dissolved; then add the liquid ammonia.

English Silver Soap.

No. 1.—Castile soap	10 parts
Water	10 parts
Whiting	30 parts

Dissolve the soap in the water, and then stir in the whiting.

No. 2.—Tripoli	10 parts
Rouge	5 parts
Pulverised chalk	15 parts

Prepare as in No. 1.

French Polish for Metals.

Ferric oxide	1 part
Carbonate of magnesia	50 parts

Mix.

Moisten a rag with water or alcohol; dip it into the powder, rub the articles thoroughly and dry them with soft leather.

Polishing Paste for Metal, Glass, etc.

Olive oil	1 part
Spirit of sal-ammoniac	1 part
Lime	2 parts
Water	1 part

Mix to a thick paste.

Magic Polish for Brass.

Sulphuric acid	20 parts
Pulverised bichromate of potash	10 parts

Mix the two ingredients and dilute with water equal in weight to the acid and potash salt.

Apply well to the brass, wash well in water, immediately wipe dry, and polish with rotten-stone.

Polishing Powder for Silverware, etc.

Washed pipeclay	4 parts
Purified tartar	1 part

Mix.

Liquid Polish for Silver-plated Ware.

Potassic cyanide	3 to 4 drm.
Nitrate of silver	8 to 10 grn.
Water	4 oz.

Dissolve the potash and silver salts in the water.

Apply with a soft tooth-brush ; wash the object thoroughly with water, dry with a soft linen cloth, and polish with a chamois skin. In the case of solid silver some precipitated chalk is allowable in the solution. Neither whiting nor powder of any kind should be used for cleaning and polishing ; they only wear out or scratch the silver.

For preserving the lustre of silver or plated ware when not needed for actual use for a considerable time, a coating of collodion is carefully applied by means of a brush, so as to cover the surface thoroughly and uniformly. It is used most conveniently when diluted with alcohol, as for photographic purposes.

Polishing Soap for Silver and Brass Articles.

Cocoanut oil	50 parts
23° soda	75 to 80 parts
Tripoli	10 parts
Alum	5 parts
Cream of tartar	5 parts
White lead	5 parts

Mix the oil and soda together and boil.

Polishing Powder for Gold.

No. 1.—Chalk	18 parts
Talc (French chalk)	5 parts
Silica	2 parts
Alumina	2 parts
Carbonate of magnesia	2 parts
Jeweller's rouge	2 parts

Mix, by putting all into a fine sieve or piece of muslin and sifting.

No. 2.—Rock alum burned and finely powdered	5 parts
Levigated chalk	1 part

Mix, and apply with a dry brush.

Formula for Longet's Polishing Powder for Gold Workers.

White lead	4·3 parts
Chalk	17·4 parts
Carbonate of magnesia	1·7 part
Alumina	4·3 parts
Silica	2·6 parts
Ferric oxide	1·7 part

Reduce all the ingredients to a fine powder; dry, and then mix and sift through a fine hair sieve to thoroughly incorporate all together.

Emerson's Polishing Compound.

This preparation is for polishing and cleaning glass, silver plate, tinware, and surfaces that permit only slight friction, and but little action.

Water	4 oz.
Carbonate of ammonia	1 oz.
Paris white	16 oz.
Aniline (q.s.) for colouring	

Mix.

The product is a solid, which can be put into moulds. As the Paris white consists of white lead, it should not be used upon the inside of culinary vessels.

Polishing Compound for Gold and Silver Lace.

Shellac	1½ oz.
Dragon's blood	½ drm.
Turmeric root	½ drm.
Alcohol	q.s.

Put the solids into a bottle and digest in the alcohol; let it settle, and then pour off the ruby-coloured tincture thus obtained.

Wabeck's Formula for a Polishing Wax.

Yellow wax	4 parts
Resin	1 part
Best oil of turpentine	2 parts

Melt the wax and stir in the resin, then take it from the fire and pour in the turpentine. Pour the mass into moulds.

Apply a little of it on a woollen rag, and rub the wood furniture.

Polish for Renovating Old Oak Furniture.

Wax, Sugar, Beer.

Boil the wax and sugar in the beer.

Wash all grease stains, etc. off the furniture with warm beer, then lay the above mixture on with a brush, and when dry rub until the article shows the desired lustre.

Harness Polish.

Glue	4 oz.
Vinegar	6 gills
Gum arabic	2 oz.
Black ink	2 gills
Isinglass	2 drm.

Break the glue in pieces, put it in a basin, and pour over it about two-thirds of the vinegar; let it stand until it becomes perfectly soft. Put the gum arabic in another vessel with the ink until it is entirely dissolved; melt the isinglass in as much water as will cover it, which may be easily done by placing the cup containing it near the fire about an hour before it is wanted for use. To mix them, pour the remainder of the vinegar, with the softened glue, into a dish over a moderate fire, stirring it until it is entirely dissolved, being careful not to let it reach the boiling point, that it may not burn the bottom—about 182° F. being the best heat. Next add the gum; let it arrive at about the same heat, and then add the isinglass. Take it from the fire and pour it off for use.

To Polish Woods in the Lathe.

Soft woods may be turned so smooth as to require no other polishing than that produced by holding it against a few fine turnings or shavings of the same wood while revolving. Mahogany, walnut, and some other woods may be polished by the use of the following mixture:—Dissolve, by heat, as much beeswax in spirit of turpentine that the mixture may become as soft as butter, and apply from a white leather pad to the wood in the lathe.

Processes for Polishing Furniture.

If the work is full of pores you should give it a coat of clear size before commencing with the polish, and, when dry, go gently over it with very fine

glass-paper. The size, by filling up the pores, will prevent both the waste of polish, which would otherwise be absorbed into the wood, and save considerable time over the work. You should place your work in such a situation that the light may shine on it obliquely, so that, by looking sideways, you may be able to see how the polishing proceeds. Make a wad with a piece of coarse flannel or drugget, by rolling it round and round, over which, on the side you mean to polish with, put a very fine linen rag doubled several times, to render it as soft as possible. Put the wad or cushion to the mouth of the bottle containing the polish and shake it, which will damp the rag sufficiently. Then proceed to rub your work in a circular direction, observing not to do more than a foot square at a time; rub it lightly till the whole surface is covered, and repeat this operation three or four times, according to the nature of the wood. Be very careful in having your rags clean and soft, as the effect of the polish depends in a great measure on its being kept clean and free from dirt. Rub each coat until the rag appears dry, and be careful not to put too much mixture upon the rag at once, and you will obtain a beautiful and lasting polish.

To Polish delicate Cabinet and Papier-maché Work.

Prepare this mixture.

No. 1.—Linseed oil	38 oz.
Spirits of wine . . .	8 oz.
Vinegar	8 oz.
Butter of antimony . .	2 oz.
Oil of turpentine . . .	8 oz.

Shake the mixture well before using, and apply with a woollen rubber.

Instead of the above the following can be used.

No. 2.—Oil of turpentine	. . .	16 oz.
Rectified oil of amber	. .	16 oz.
Olive oil		16 oz.
Oil of lavender	. . .	1 oz.
Tincture of alkanet	. .	½ oz.

Mix; apply with a cotton rubber well saturated, and then well rub with soft dry cotton rags and wipe dry.

No. 3.—Sandarac	. . . .	3 or 4 pieces*
Boiled oil	. . . .	1 pint
Venice turpentine	. . .	1 drm.

A little turpentine if needed to thin with.

* Each the size of a walnut.

Boil the sandarac and oil for 1 hour; when cooling add the Venice turpentine, and if too thick add a little oil of turpentine.

Apply the mixture all over the furniture, and after some hours rub it off; rub the furniture daily without applying fresh varnish, except about once in two months. Water does not injure this polish, and any stain or scratch may be again covered, which cannot be done with French polish.

Wood Finishing.

Richness of effect may be gained in decorative woodwork by using woods of different tone, such as amaranth and amboyna, by inlaying and veneering. The Hungarian ash and French walnut afford excellent veneers, especially the burls or gnarls. The following few useful notes on the subject are given by an American authority. In varnishing, the varnishes used can be toned down to match the wood, or be made to darken it, by the addition of colouring matters. The compositions known as wood fillers are made up in different colours for the purpose of preparing the surface of wood previous

to the varnishing. They fill up the pores of the wood, rendering the surface hard and smooth. For polishing mahogany, walnut, etc., the following is recommended :—

Linseed oil	24 oz.
Amber	16 oz.
Litharge	5 oz.
White lead pulverised . .	5 oz.
Minium	5 oz.
Clove of garlic . . .	1

Boil the oil in an untinned copper vessel, and suspend in it the litharge and minium in a small bag, which must not touch the bottom of the vessel. Continue the boiling until the oil has acquired a deep brown colour; then take out the bag and put in the garlic; repeat this seven or eight times, the boiling being always continued. Before adding the amber with the oil, mix with it 2 oz. linseed oil, and melt it over a brisk fire. When the mass is fluid it is to be boiled and stirred continuously for two or three minutes; afterwards filter the mixture, and preserve it in bottles tightly corked. When this filler is used the wood must be previously well sand-papered, polished, and covered with a thin coat of soot and spirit of turpentine. When the coat is dry some of the filler may be applied, which should be equally distributed on every part with a small fine sponge, and rubbed well in.

When dry run over it with fine sand-paper and polish with French polish, or, if preferred, turpentine and beeswax. For securing a deeper colour, add some Venetian red to the above receipt, and rub well in afterwards.

Polishing Black Woodwork.

No. 1.—90 per cent. alcohol . .	2½ oz.
Oil of almonds . . .	1 drm.
Gum elemi	1 drm.
Orange shellac . . .	½ oz.

Pound fine and put into a bottle to dissolve; when dissolved, rub on with white wadding.

No. 2.—Orange shellac . . . 2 oz.
Naphtha . . . . . ½ pint
Benzoin . . . . . 2 drm.

Mix, and put in warm place for a week, and keep the materials from settling by shaking up.

To Polish Ebony.

No. 1.—Give the work two coats of fine copal varnish, and rub this down (when dry) quite smooth with fine pumice-stone; put on a third coat of the same and rub down with rotten-stone; clean, and put on a flowing coat of best spirit copal varnish, and, when this has become quite dry, polish with chamois skin and the palm of the hand.

No. 2.—Add ¼ oz. of best deep black to ½ gill French polish. A little of the deep black may be used on the inside, and rubbed in with linen rag.

To put an Eggshell Polish on Wood.

Shellac . . . . . 3 parts
Gum mastic . . . . . 1 part
Sandarac gum. . . . . 1 part

Dissolved together in 40 parts alcohol, form a beautiful polish. Apply with brush or rag.

A good Polish for Walking Canes and other Hard Wood.

The following process gives the most satisfactory and hardest finished surface:—Fill with best clear filler or with shellac, dry by heating, rub down with pumice; then put on three coats of clear spirit copal varnish, hardening each in an oven at a temperature as hot as the wood and gum will safely stand. For extra work, the first two coats may be rubbed down and the last allowed a flowing coat. For coloured grounds, alcoholic shellac varnish, with any suitable

pigment (very finely ground in), can generally be used to advantage.

Water Polish.

Whiting	9⅝ oz.
Alcohol	16 oz.
Ammonia	1⅜ oz.

Shake well together.

Dry Shining.

This is a new process of polishing or shining, called the American system, and is used mostly for American black walnut. First oil; fill in then with a wet rubber passed smoothly over the work straight from end to end, until a shine or gloss appears; no oil to be used on the rubber, and no spiriting off is required. Be careful to dry, rub well, and have the work free from rubber marks.

FORMULAS FOR POLISHING VARIOUS METALS.

To Polish Brass.

Rub the metal with rotten-stone and sweet oil, then rub off with a piece of cotton flannel and polish with soft leather. To remove the tarnish off brass, use a solution of oxalic acid. Wash the acid off with water and rub the brass with whiting and soft leather. A mixture of hydrochloric acid and alum dissolved in water imparts a golden colour to brass articles that are steeped in it for a few seconds.

Polishing Paste for Brass.

No. 1.—Oxalic acid	3 parts
Hot water	40 parts
Powdered pumice-stone	100 parts
Oil of turpentine	2 parts
Soft soap	12 parts
Neatsfoot oil	12 parts

Dissolve the oxalic acid in the water and then add the other ingredients.

Polishing Paste for Brass and Copper.

No. 2.—Rotten-stone . . . . 3 oz.
Powdered soap . . . 1 oz.

Mix, and use with a little water.

No. 3.—Rotten-stone . . . . 7 oz.
Oxalic acid powdered . . 1 oz.

Mix, and apply damped with a little water.

No. 4.—Soft soap . . . . 2 oz.
Rotten-stone . . . . 4 oz.

Beat into a paste.

No. 5.—Rotten-stone made into a paste with sweet oil.

Magic Polish for Brass.

Sulphuric acid . . . 20 parts
Bichromate of potash pulverised . . . . . 10 parts
An equal weight of water.

Put the potash salt in the acid and dilute with the water, and apply well to the brass; wash well in water immediately, wipe dry, and polish with rotten-stone.

Polishing Cloth for Metals.

Soap. . . . . 4 oz.
Pumice stone or emery finely powdered . . . . 2 oz.
Water . . . . . 20 oz.

Infusorial earth may be used with advantage. Saturate the best unbleached muslin with this paste, and rub the metals. Colour with a little aniline red, if desired.

To Polish Gas Fixtures.

Pickle, and while in the lathe, dip the burnisher in the following liquid:—60 parts turmeric root,

60 parts orange shellac dissolved in 20 parts of tartar, 3 parts of ox-gall, 6 parts alcohol, 180 parts of water. Dry with a soft cloth.

To make Iron take a Bright Polish like Steel.

Blue vitriol (sulphate of copper)	1½ oz.
Borax	1½ oz.
Prussiate of potash (ferrocyanide of potassium)	1½ oz.
Charcoal	1½ oz.
Sifted common salt (chloride of sodium)	¾ part.
Water	6 gills

Heat.

Add 6 quarts of linseed oil; mix well. Bring the iron or steel to the proper heat, and then cool it by dipping in this solution.

To Polish Lead.

Use jeweller's rouge on a chamois skin.

To Polish Wrought Iron.

Warm the articles till they are unbearable to the hand; then rub them with clean white wax. Heat the goods again, so that the wax may spread over them; then rub them over with a piece of serge.

To give Iron Articles a Brilliant Lustre.

Pulverised arsenious acid	7½ drm.
Elutriated bloodstone	7½ oz.
Antimony trichloride (butter of antimony)	3¾ oz.
Alcohol 90 per cent.	5 pints

Pour the alcohol over the other articles, and digest at a gentle heat, frequently shaking. When iron is polished with this fluid, it precipitates upon it a thin film of antimony and arsenic, which protects

the iron from oxidation, and also gives it a fine appearance.

To Polish Old Brasswork which has been Scratched and Tarnished by Wear.

Pumice or bath-brick should be used with, and water for, scouring off work, and rotten-stone with kerosene oil for the wet finish, and dry for the final polish. The same method should be used for new brasswork.

To Polish Zinc.

Scrape it, and polish with lime dust.

To Polish Finished Surfaces.

Oil is usually employed for polishing delicate instruments, which tends to soil those using it. Oil may be advantageously replaced by a mixture of 3 parts glycerine and 1 of alcohol for large surfaces. When small ones are to be treated, pure glycerine can be used.

Formula for Marble Dressing or Polish.

Pure beeswax . . .	10 parts
Japan gold size . . .	2 parts
Spirit of turpentine . .	88 parts

This mixture is of creamy consistence, and should be applied in small quantities with the aid of a piece of white flannel. If it is desired for use upon white marble, white wax may be substituted. The same preparation can be used to advantage on woodwork. The japan size prevents the stickiness which exists when wax alone is used.

To Polish Imitation Marble.

When you have finished marbling, let the work stand for a day or two, then gently rub it down with

the back or smooth side of a sheet of sand-paper. This will take off the nits or bits of skin which may be upon it without scratching it. Now give it three coats of the best pale polishing copal varnish, allowing an interval of two days after each coat. Let this stand for three weeks, then cut it down with ground pumice and water, using a piece of wash-leather or rag for that purpose. When you have got it tolerably smooth and level, wash it well with clean water, taking particular care to clean off all the pumice ; give it five coats of varnish. It ought now to stand for three to six months before it is polished, for if it is done before, the varnish is almost certain to crack. When the varnish is sufficiently hard, cut it down with ground pumice as before, then use rotten-stone and olive oil, rubbed in by the ball of the hand, then flour and oil, finish off with dry flour. This takes a deal of time to do it properly, but the result is good.

To Polish Mother-o'-Pearl.

Add olive oil to finely pulverised rotten-stone, so as to form a thick paste ; then add sulphuric acid in sufficient quantity to make it liquid. Apply this paste, and rub with a cork covered with velvet, and as soon as the pearl takes the polish, wash off. This is a fine polish.

To Polish Slate.

Slate is first ground to a face by an iron plate with river sand and water, then smoothed with pumice stone, and polished with rotten-stone and oil.

To Polish Plaster of Paris Work.

Add to the gypsum 1 or 2 per cent. of alum, sulphate of potash or borax. The gypsum will set slowly, and is then capable of receiving a high polish.

To Polish Show Cases.

A good polishing powder consists of :—

Rock alum (burned and finely powdered)	3 parts
Levigated chalk	1 part

Mix ; apply with a dry brush, and rub off with wash leather.

To Polish Vulcanite.

No. 1.—Remove scratches with a smooth wet Ayr stone, and then polish in the lathe with fine pumice and a stiff brush. After washing the pumice off, polish it with whiting and a soft brush.

No. 2.—The mathematical instrument makers treat it as brass, that is, for flat work they first use water of Ayr stone, and then rotten-stone and oil. Turned work is polished in the lathe with rotten-stone and oil, taking care not to use too high a speed, which would heat the work. Some use lampblack and oil to finish with, where a very high polish is wanted.

Compound for Waxing and Polishing Floors.

Linseed oil	200 parts
Litharge	20 parts
Wax	150 parts
Tallow	18 parts
Molasses	190 parts
Lampblack	103 parts
Oil of turpentine	210 parts
Alcohol	35 parts
Shellac	5 parts
Aniline violet	2 parts

Boil the linseed oil with the litharge for 1 hour, then melt the wax and tallow in the hot fluid, add the molasses, and keep the whole at a temperature of 230° to 248° F., until all the water is volatilised ;

then add the lampblack or any other colouring matter, and, after cooling, the oil of turpentine, and finally the shellac, dissolved in alcohol, and the aniline violet.

To Polish Piano Keys.

The frame would not hold the keys sufficiently level or firm. A better way would be to hand-screw a few at a time on a board, and scrape them in that position. They should be burnished with flour paper, care being taken that they do not get too hot during the process. Unless the keys are very hollow, or much discoloured, it would perhaps be better to dispense with the scraper altogether, using a coarse glass-paper in its stead. They should preferably be polished singly, on a board covered with several thicknesses of cloth, placed on a bench, and the ivories vigorously rubbed, lengthwise and face downwards, until a good polish is obtained. Putty powder is the best polishing material, though pumice might first be used to take out any marks left by the paper. A very brilliant polish may be got by finishing the keys with a similar board covered with wash-leather, and sprinkled with rouge. A liberal supply of water is necessary during the process.

WOOD VARNISHES.

Volatile Copal Varnish.

No. 1.—Copal	. . . . .	6 oz.
Ether	. . . . .	1 oz.
Alcohol	. . . . .	6 oz.
Oil of turpentine	. . .	4 oz.

Digest together.

No. 2.—Copal	. . . . .	1 oz.
Acetone	. . . . .	3 oz.

Elastic Copal Varnish.

Camphor	1 oz.
Copal	4 oz.
Ether	12 oz.

A very long time is required to permit this mixture to become clear. After several weeks standing, pour off the top clear portion, and the thick portion, on which the swelled-up copal is, mix with $\frac{1}{2}$ to $\frac{3}{4}$ oz. camphor, 2 oz. copal, and 12 oz. ether, and again digest.

Coloured Varnish with Gold Lustre for Frame Mouldings.

These varnishes can be easily prepared by adding to a thick solution of shellac a corresponding quantity of any aniline colouring matter which has been dissolved in spirits of wine, and red, blue, violet and green tones of colour may be thus produced. After the aniline varnish has become dry, the articles should receive a coat of a colourless varnish.

Gold Lac Varnish.

No. 1.—Gamboge	1 oz.
Mastic	2½ oz.
Seedlac	2½ oz.
Saffron	$\frac{1}{10}$ oz.
Alcohol	15 oz.

Digest the saffron in a little alcohol, and also the gamboge, dissolve the resin in the remainder ; then mix.

No. 2.—Dragon's blood	2 oz.
Turmeric	15 oz.
Gamboge	2 oz.
Elemi	3 oz.
Seedlac	2 oz.
Sandarac	5 oz.
Spirits of wine	5 oz.

Same as the last.

Amber and Copal Varnish (Volatile).

Amber	10 oz.
Copal	30 oz.
Venetian turpentine	5 oz.
Oil of turpentine	80 oz.

Same as the last.

Amber Varnish (Volatile).

Amber	3 oz.
Venetian turpentine	½ oz.
Oil of turpentine	10 oz.

Melt the amber, and, when cool enough, add the oil of turpentine, and then the Venetian turpentine.

Amber Gold Lac Varnish.

Stick lac	4 oz.
Yellow transparent amber	1 oz.
Refined sandarac	1½ oz.
Mastic in tears	1 oz.
Pure light yellow colophony	3⅓ oz.
Dragon's blood	1 oz.
Turmeric	1 oz.
Gamboge	1 oz.
Alcohol 96 per cent.	4·4 lb.

Powder the solids, and digest all in the alcohol by the heat of a sand bath, and filter through a cloth filter. Warm the varnish, and also the article to be varnished, before laying on the varnish.

English Durable Gold Lac Varnish.

Alcohol 96 per cent.	2¼ lb.
Stick lac (powdered)	17½ oz.

Dissolve by heat, and filter through canvas.

Mixed Gold Lac Varnish.

Refined sandarac	9·8 oz.
Pure light coloured copal	3½ oz.
Stick lac	2·1 oz.
Alcohol 96 per cent.	4·4 lb.
Turmeric	0·52
Gamboge	1·05 oz.
Alcohol 96 per cent.	8¾ oz.

Powder the sandarac, copal and stick lac, and dissolve in the alcohol by heat of water bath.

Gold Lac Varnish (Thompson's Formula).

Gamboge	4⅕ oz.
Stick lac	4⅕ oz.
Annatto	4⅕ oz.
Dragon's blood	4⅕ oz.
Saffron	1 oz.
Venetian turpentine	4⅕ oz.
Alcohol	q.s.

Powder all the solid ingredients, and put each powder into a separate flask, and pour over each 37 oz. alcohol 96 per cent. Give two weeks' rest to digest, with frequent shakings, then to each flask add the 4⅕ oz. Venetian turpentine, and filter through linen.

Elastic Tar Oil Varnish for Finely Polished Goods and Turned Articles.

Sandarac	6 oz.
American pine resin	2 oz.
Mastic	2 oz.
Venetian turpentine	1 oz.
Camphor	⅕ oz.
Oil of lavender	⅕ oz.
Varnish oil	24 oz.
Alcohol 90 per cent.	4 oz.

Melt the resin with the turpentine by the heat of a sand bath, dissolve the camphor and essential oil in the spirits of wine, and mix the two solutions.

Dutch Gold Varnish.

Mastic	12½ oz.
Sandarac	12½ oz.
Colophony	3 oz.
Aloes	6 oz.
Oleum spicæ (oil of spike lavender)	20 oz.
Venetian turpentine	⅘ oz.

Powder the first four ingredients and dissolve in the oleum spicæ by placing the vessel in a water bath; then add the Venetian turpentine and filter the mixture.

If this varnish be laid warm and very thin on polished tin, it will produce a beautiful gold colour. Wood, leather, etc., upon which silver leaf has been fastened with the white of an egg, can be beautifully gilt with this varnish.

Gold Varnish without Lac.

15½ oz. copal, 8 oz. white boiled turpentine, 2 oz. camphor, alcohol q.s. Dissolve the above ingredients in sufficient spirit, then prepare a solution of 15½ oz. of sandarac, 8 oz. mastic, 4 oz. annatto, and 2 oz. aloes in alcohol q.s., and mix the two solutions.

Copal Varnish with Spirit of Sal-Ammoniac.

Crush up copal resin, and gradually pour over it spirit of sal-ammoniac, until the whole is swelled up to a thick transparent mass. Heat this to 100° F., then mix it gradually with alcohol 75 to 80 per cent.; shake thoroughly, and finally add more alcohol to give the mixture the requisite consistency.

Incombustible Varnish for Wood.

Apply a solution of equal parts of alum and isinglass to the place exposed to the flame; this prevents ignition, but not the transmission of heat.

Excellent Glass-like Varnish.

Dissolve at a moderate heat 4 parts of camphor, 60 parts of sandarac, 15 parts each of Venetian turpentine and oil of turpentine, and 4 parts of white sugar in 400 parts of spirits of wine of 96 per cent. and clarify the solution by allowing it to stand for some time. On using the varnish expose the article to be coated to a gentle heat, and then apply the solution, which, when it becomes dry, will form a beautiful glass-like coat.

Varnish for Wood naturally Coloured, or Shaded.

Pulverise and dissolve 3 parts of light-coloured shellac, 2 of sandarac, 2 of white resin, and ½ of camphor in 24 of alcohol of 80 per cent. Put first the shellac, sandarac and camphor in the alcohol, tie up the vessel with a piece of wet bladder, and shake it for half an hour; then add the resin, and boil the mixture several times in a suitable vessel. Filter the varnish while yet warm through cotton or felt, and to clarify it let it stand in a well-closed bottle for twelve hours. No more varnish than is to be used in two or three days should be prepared at one time, since age impairs its beauty and hardness.

Cabinet-maker's Varnish.

Very pale shellac . . .	2½ lb.
Mastic	3½ oz.
Alcohol	2½ or 3 pints

Dissolve all the ingredients together in the cold with frequent stirring. The varnish, which is used for French polishing, is always opaque. A similar varnish made with weaker spirit is used by bookbinders to varnish morocco leather book covers.

Best Pale Carriage Varnish.

This varnish, although intended for the varnishing of the wheels, springs and carriage parts of

coaches, etc., is also used by house painters and decorators, as from its drying quality and strong gloss it suits their general purposes well.

No. 1.—Second sorted African copal .	4 lb.
Clarified oil	5 qrt.
Dried copperas . . .	2 oz.
Litharge	2 oz.
Turpentine	2¾ gall.

No. 2.—Second sorted gum anime .	4 lb.
Clarified oil	5 qrt.
Dried sugar of lead . .	2 oz.
Litharge	2 oz.
Turpentine	2¾ gall.

Prepare as separate varnishes, strain the first while hot, and then mix both together while still hot. This varnish will dry hard if well boiled—four hours in summer and six in winter. The method of preparation is identical with that of Pale Amber Varnish.

Second Carriage Varnish.

This varnish is principally intended for varnishing dark carriages or black japan, and is also used by house painters for dark work. When these resins are poured into the boiling pot, and the regular portion of driers put in and well boiled, this varnish will dry hard and firm in four hours in winter and two in summer.

Second sorted gum anime .	4 lb.
Fine clarified oil . . .	5½ qrt.
Turpentine	10½ qrt.
Litharge	2 oz.
Dried sugar of lead . .	2 oz.
Dried copperas . . .	2 oz.

Boil and mix as before, straining the result through canvas. Add enough oil of turpentine to make the mixture of the proper consistency, and do

not leave off stirring till perfectly mixed. This varnish is very tough.

Body Varnish (for Coachmakers, etc.).

No. 1.—Finest African copal	¼ lb.
Clarified oil	1 gall.
Oil of turpentine	1¾ gall.

Fuse the resin carefully, add the oil, and then boil the mixture for 4½ hours, or until quite stringy; then allow it to cool a little, and pour in the oil of turpentine. This varnish dries slowly.

No. 2.—Pale copal resin	¼ lb.
Clarified oil	1 gall.
Dried sugar of lead	¼ oz.
Turpentine	1¾ gall.

Varnish for Restoring Whitened German-Gold Frames.

Gamboge	30 grn.
Dragon's blood in coarse powder	½ oz.
Turmeric powder	30 grn.
Shellac	2½ oz.
Sandarac	2½ oz.
Turpentine	1 pint
Mastic varnish	¼ oz.

Place all the ingredients in a bottle, except the mastic, with the turpentine, and keep it in a warm place for a fortnight, shaking at intervals, then filter and add the mastic varnish. Apply this preparation with a brush to metal frames.

Varnish for Imitation Gilding.

This varnish gives a very good imitation of gilding on brass and bronze articles.

Gum lac	8 parts
Dragon's blood	2 parts
Turmeric	½ part
Alcohol	166 parts

Digest all together.

Coat the metal with the varnish in all directions by means of a sponge, and then immediately warm over a gentle charcoal fire. The surface at first will appear dull, but will soon resemble the finest gilding. Keep the varnish in well-stoppered bottles.

Varnish for Common Work.

Useful for outside work on wood or iron.

Resin, powdered	3 lb.
Turpentine	2½ pints
Boiled oil	5 qrt.

Pour the turpentine over the resin, in a tin can, give an occasional shake during a couple of days, then add the oil, and allow the mixture to stand in a warm room till clear. Decant the clear portion for use, or reduce it with turpentine to the proper consistency.

Another Varnish for Frames.

Sandarac	2 oz.
Mastic in tears	1 oz.
Shellac	2 oz.
Venice turpentine	¾ oz.
Alcohol 90 per cent.	1 pint
Spirit of turpentine	1 oz.

Put all the ingredients, except the last, into a suitable vessel, and dissolve by the heat of a sand bath ; when well mixed add the spirit of turpentine, and boil for thirty minutes ; let it cool, and strain through cotton cloth.

Apply the varnish to the frame with a brush.

Dead Ground Varnish for Imitation Gilt Frames.

Shellac	1 lb.
Whiting	1 lb.
Alcohol	q.s.

Dissolve the shellac in a little alcohol, add the

whiting, and then stir in enough alcohol to make 1 gallon of varnish.

Dutch Furniture Varnish.

Sandarac	37½ parts
Refined shellac	12½ parts
Colophony	25 parts
Venetian turpentine	25 parts
Alcohol	250 parts

First dissolve the shellac in the alcohol and filter.

Varnish Impervious to Wet.

Boiled oil	100 parts
Finely divided litharge	6 parts
Genuine beeswax	5 parts

Boil until sufficiently thick and stringy, then pour off the clear.

Gold Varnishes.

No. 1.—Shellac	16 oz.
Sandarac	3 oz.
Mastic	3 oz.
Crocus	1 oz.
Gamboge	1 oz.
Alcohol	144 oz.

Digest all in the alcohol, except the gamboge, which add to the prepared varnish.

No. 2.—Seedlac	8 oz.
Sandarac	8 oz.
Mastic	8 oz.
Gamboge	2 oz.
Dragon's blood	1 oz.
White turpentine	6 oz.
Turmeric	4 oz.
Alcohol	12 oz.

Dissolve and prepare as before, adding the turpentine last.

No. 3.—Turmeric	1 drm.
Gamboge	1 drm.
Shellac	5 oz.
Sandarac	5 oz.
Dragon's blood	7 drm.
Thin mastic varnish	8 oz.
Oil of turpentine	2 pints

Digest with occasional shaking for a fortnight in a warm place, then let it stand to clear, and pour off the clear portion for use.

Japanese Varnish.

Copal	15 parts
Camphor	1 part
Oil of turpentine	60 parts
Oil of lavender	15 parts

Dissolve the copal and camphor in the oil of turpentine, and then add the oil of lavender.

Black Japanese Varnish.

No. 1.—Asphaltum	1 part
Boiled oil	50 parts
Burnt umber	2 parts
Oil of turpentine	q.s.

Dissolve the asphaltum in a portion of the oil, rub up the umber in a little oil, then mix the two compounds, put in the remainder of the oil, stir well, and then thin with oil of turpentine.

No. 2.—Shellac	25 parts
Wood naphtha	100 parts

Dissolve.

Japan Varnish.

Naples asphaltum	6 lb.
Dark gum anime	1 lb.
Linseed oil	1½ gall.
Dark umber	1 lb.
Linseed oil	1 qrt.
Turpentine	8½ or 4 gall.

Boil the asphaltum, anime and linseed oil together for two hours in half the oil. Then boil the umber in the second portion of linseed oil, and mix the two together. Afterwards, boil two hours longer till the mass, when cooled, is plastic like putty. Finally dissolve this plastic mass in the turpentine ; the result is a good black japan fit for wood or metal.

Varnish for Mahogany.

No. 1.—Sorted gum anime	. . .	2 lb.
Clarified linseed oil	. .	3 qrt.
Litharge powdered.	. .	1 oz.
Dried sugar of lead powdered		1 oz.
Oil of turpentine	. . .	5½ qrt.

Boil the ingredients till the varnish strings well, then let it cool, and thin with turpentine.

No. 2.—Gum sandarac	. . .	2 oz.
Shellac	. . . . .	1 oz.
Gum benjamin	. . .	½ oz.
Venice turpentine	. . .	1 oz.
Alcohol 90 per cent.	. .	1 pint
Dragon's blood or saffron	.	q.s.

Put all the ingredients into a bottle ; stand in a warm place till the gum dissolves, then strain for use.

Brown Hard Spirit Varnish.

No. 1.—Sandarac	. . . .	4 oz.
Pale seedlac	. . . .	2 oz.
Elemi	. . . . .	1 oz.
Alcohol	. . . . .	1 qrt.
Venice turpentine	. . .	2 oz.

Dissolve by agitation and rest in the alcohol, then put the turpentine into the fluid mixture and well mix.

No. 2.—Sandarac . . . . . 3 oz.
Shellac . . . . . 2 oz.
Alcohol (65 over proof) . . 1 qrt.
Turpentine varnish . . 1 qrt.

Dissolve, add the turpentine varnish, mix well and strain. A very fine varnish.

No. 3.—Seedlac . . . . . 1½ oz.
Yellow resin . . . . . 1½ oz.
Rectified alcohol . . . 1 qrt.

Linseed Oil Varnish.

Linseed oil . . . . . 60 parts
Litharge . . . . . 2 parts
White vitriol . . . . . 1 part

Boil all together, or else rub up four parts borate of manganese with some of the oil, then add linseed oil 3000 parts, and heat to boiling.

Turpentine Varnish.

Clear resin, powdered . . 10 oz.
Spirit of turpentine . . 1 pint

Dissolve by gentle heat, and then boil for half an hour; when cool, it is fit for use.

Oil Varnishes.

No. 1.—Resin . . . . . 3 lb.
Drying oil . . . . . 12 qrt.
Oil of turpentine . . . 2 qrt.

Melt the resin in the oil by heat, and then add the turpentine to thin.

No. 2.—Resin . . . . . 3 lb.
Venice turpentine . . . 2 lb.
Pale drying oil . . . 1 gall.

Melt the resin by heat, then add the Venice turpentine and oil, and when cool enough, thin with 1 qrt. of turpentine.

Oak Varnishes.

No. 1.—Clear pale resin . . . 1¾ lb.
Oil of turpentine . . . 2 qrt.

Dissolve; if wanted darker, colour with a little fine lampblack.

No. 2.—To the last add 30 oz. Canada balsam. Oak varnish is synonymous with common turpentine varnish and wainscot varnish.

No. 3.—Clear varnish turpentine . 4 pints
Oil of turpentine . . . 5 pints

Mix. Both are good common varnishes for wood or metal.

Wainscot Varnish.

Second sorted anime . . 4 lb.
Clarified oil . . . . 1½ gall.
Litharge . . . . . 2 oz.
Dried copperas . . . 2 oz.
Dried sugar of lead . . 2 oz.
Turpentine . . . . 2¾ gall.

Boil all until the mixture strings very strong, then stir and mix well, and strain. This varnish is principally intended for house-painters, grainers, builders and japanners; it will dry in two hours in summer, and in four in winter.

METAL VARNISHES.

Black Varnish for Coal Buckets.

Asphaltum . . . . 1½ lb.
Lampblack . . . . ⅜ lb.
Resin . . . . . ¾ lb.
Spirits of turpentine . . 1½ qrt.

Dissolve the resin and asphaltum in the turpentine, form a paste with the lampblack and linseed oil q.s. Mix with the other; apply with a brush.

Brunswick Black.

No. 1.—25 lb. black pitch, 25 lb. gas-tar asphaltum; boil gently for five hours, then add 8 gall.

linseed oil, 10 lb. litharge, 10 lb. red lead; boil, and when cooled a little, thin with 20 gall. oil of turpentine.

No. 2.—Many recipes for making this varnish do not mention the secret, viz. to boil the asphaltum until all the moisture is driven off. Take 7 lb. of pitch and 7 lb. asphaltum; boil in an iron pot for seven to ten hours with frequent stirring; when all the moisture is out, add 2 gall. boiled oil previously heated, then add 2½ lb. red lead and 2½ lb. litharge, and boil for three hours or until some of it will set hard. Dissolve in turpentine as much as will reduce it to the consistence best suited to your work as you require to use it from time to time.

Black Varnish for Zinc.

No. 1.—Dissolve 2 parts of nitrate of copper and 3 parts of crystallised chloride of copper in 64 parts of water, and add 8 parts nitric acid. (This is Böttzer's formula.)

No. 2.—Dissolve equal parts of potassic chlorate and cupric sulphate in 36 times as much water; warm, and leave the solution to cool. Immerse the articles in the solution, and when black, rinse with water and dry.

Tar Varnish.

No. 1.—Coal tar	. . . . .	1½ gall.
Spirits of turpentine	. .	¾ pint
Oil of vitriol	. . . .	3 oz.

Mix the tar and sulphuric acid together, and apply with a brush as it becomes thick.

No. 2.—Heat tar to 156° F., and mix with it equal parts of hydraulic lime and Roman or Portland cement. The mixture is a thin fluid; when dry it is soft and flexible.

Varnish for Silver Ware.

Gum elemi	3 oz.
White amber	4½ oz.
Charcoal	3 oz.
Spirits of turpentine	37½ oz.

Mix all together and use hot, the metal also being heated.

WOOD VARNISHES.

Black Varnish for Wood.

No. 1.—The ordinary black varnish for woods of different kinds is obtained by boiling together blue Brazil wood, powdered gall apples and alum, in rain or distilled water until it becomes black. The liquid is then filtered and applied to the objects while still warm. The coats are repeated until the wood appears of a fine black colour. It is then coated with the following varnish: a mixture of iron filings, vitriol and vinegar is heated without boiling, and left a few days to settle.

No. 2.—For the fine black imitation ebony, apple, pear and Brazil wood are recommended in preference as the woods suitable to be stained. Take

Nut galls	14 oz.
Logwood dust	3½ oz.
Vitriol	1¾ oz.
Verdigris	1¾ oz.

Boil in an earthenware pot, and brush over the wood with the decoction whilst hot several times.

For a second coating a mixture of 3 oz. of pure iron filings, dissolved in about a pint of strong wine vinegar, is warmed, and when cool, the wood already blackened is coated two or three times with it, allowing each coat to dry before applying the next one.

Collodion Varnish.

Castor oil	1 oz.
Collodion.	1 qrt.

Mix, and use for varnishing maps, etc.

Chinese Varnish.

No. 1.—Shellac	1 part
Alcohol	15 parts
A small piece of camphor.	

Dissolve by the sun's heat, shaking, and strain.

No. 2.—Mastic	2 oz.
Sandarac	2 oz.
Strong alcohol . . .	20 fluid oz.

Dissolve. Dries in six minutes.

SPECIAL VARNISHES FOR BOOKS, LEATHER, Etc.

Varnishes for Bookbinders.

No. 1.—Elemi . . . . . 4 oz.
Mastic . . . . . 4 oz.
Sandarac . . . . . 6 oz.
Venetian turpentine . . 3 oz.
Spirits of wine . . . 30 oz.

Dissolve the resins in the alcohol in the usual way (i.e. by gentle heat and agitation), strain, and then mix the turpentine thoroughly with it.

No. 2.—Pale sandarac . . . 3 oz.
Alcohol . . . . . 20 fluid oz.

Dissolve by cold digestion and frequent agitation.

No. 3.—Dissolve pale shellac in wood naphtha.

No. 4.—Mastic in tears . . . 6 oz.
Alcohol 90 per cent. . . 32 oz.
Spirit of turpentine . . 3 oz.

Place the ingredients in a sand bath over a fire and let them boil, stirring them well. When thoroughly mixed, introduce the turpentine. Boil for half an hour; remove from the fire, let it cool, and then strain through a cotton cloth.

No. 5.—Sandarac . . . . 8 oz.
Mastic . . . . . 2 oz.
Shellac . . . . . 8 oz.
Venice turpentine . . . 2 oz.
Alcohol 90 per cent. . . 3 pints

Digest in the cold with frequent shaking. Apply lightly on to the book with a piece of warm cotton wool, a small sponge, or a brush.

Colourless Varnish for Bookbinders.

A German authority gives the following directions for making these and several other beautiful varnishes: For 1½ lb. good shellac take 2 oz. crystallised carbonate of soda, and ¾ gall. of water. Put the whole in a clean pot or copper vessel of double the capacity, and under constant stirring bring it to boiling over a slow fire. The shellac will dissolve, and if it is intended to make colourless French varnish, the solution has to be run through a woollen cloth.

Lessing's Colourless Varnish.

Shellac	2½ oz.
Alcohol 90 per cent. . .	1 pint
Well-burnt and recently-heated animal charcoal in powder .	5 oz.

Boil a few minutes. A small portion of the solution should then be filtered, and if not colourless more charcoal must be added. When all colour is removed, press the liquor through a piece of silk and afterwards filter through fine filtering-paper. This kind of varnish should be used in a room at least 60° F., perfectly free from dust. It dries in a few minutes, and is not liable afterwards to chill or bloom. It is particularly applicable to drawings and prints that have been sized, and may be advantageously used upon oil paintings which are thoroughly hard and dry, as it brings out the colours with the purest effect. This quality prevents it from obscuring gilding, and renders it a valuable varnish for all kinds of leather, as it does not yield to the warmth of the hand and resists damp, which subjects leather to mildew. Its useful applications are very numerous,

indeed to all the purposes of the best hard spirit varnish.

Harness Varnish.

No. 1.—Isinglass	. . . .	1 oz.
Indigo	. . . .	1 oz.
Logwood	. . . .	16 oz.
Best glue	. . . .	16 oz.
Soft soap	. . . .	8 oz.
Vinegar	. . . .	2 qrt.

Mix by heat, and strain.

No. 2.—Alcohol	. . . .	½ gall.
White turpentine	. . .	¾ lb.
Shellac	. . . .	¾ lb.
Venice turpentine	. . .	½ gall.
Olive oil	. . . .	q.s.

Digest the resins in the fluids, and, when dissolved, add a little olive oil and colour, if desired, with lampblack.

Varnish Cement for Fastening Leather to Metal.

Dissolve 1 oz. of gum arabic in water, and an equal weight of isinglass in brandy, and mix.

VARNISHES FOR LEATHER.

Flexible Varnish for Leather.

Burnt umber	. . . .	2 oz.
Asphaltum	. . . .	1 oz.
Linseed oil	. . . .	1 qrt.

Colourless Varnish for Leather.

Pale shellac	. . . .	5 oz.
Borax	. . . .	1 oz.
Water	. . . .	1 pint

Digest nearly at the boiling point until dissolved; then strain.

Elastic and Clean Varnish for the Leather of Ladies' Shoes.

Put three pints of rain or soft water in a pot over the fire, and, when boiling, add 4 oz. of white pulverised wax, 1 oz. clear transparent glue in small pieces, 2 oz. pulverised gum Senegal, 2 oz. white soap scraped fine, 2 oz. brown pulverised sugar. The ingredients are placed in one by one, and stirred up. It is well to take the pot from the fire every time a substance is added, to prevent boiling over. When all are added, remove from the fire, and when sufficiently cooled, add 3 oz. alcohol and finally 3 oz. of fine Frankfort black, and incorporate by continued stirring. This varnish can be put on the leather with a brush, and polished.

Varnish for the Edges of Shoes.

Shellac	2 oz.
Resin	1 oz.
Lampblack	¼ or ⅛ oz.
Turpentine	½ oz.
Alcohol	8 fluid oz.

Mix by gentle heat.

Black Varnish for Shoe and Harness Edges.

Shellac	1½ oz.
Resin	1 oz.
Pure turpentine	½ oz.
Lampblack	⅛ oz.
Alcohol 98 per cent.	½ pint

Dissolve. This varnish may also be applied to wood when a gloss is required.

Varnish for Boots.

Beeswax	10 parts
Spermaceti	6 parts
Oil of turpentine	66 parts
Asphalt varnish	5 parts
Powdered borax	1 part
Bone black	5 parts
Prussian blue	2 parts
Nitrobenzol	1 part

Melt the wax, add the borax, and stir till a kind of jelly has formed. In another pan melt the spermaceti, add the asphalt varnish, previously mixed with oil of turpentine, stir well, and add the wax. Lastly, add the colour, previously rubbed smooth with a little of the wax; perfume with nitrobenzol. Apply it thinly, wipe with a cloth, and brush the boots afterwards.

ENGRAVERS' VARNISHES.

Etching Varnish (Lawrence's Formula).

White wax	2 oz.
Black pitch	½ oz.
Burgundy pitch	½ oz.
Asphaltum in powder	2 oz.

Melt the wax and pitches together, and add the asphaltum by degrees, and boil till a drop taken out on a plate will break when cold by being bent double two or three times between the fingers. It must then be poured into warm water, and made into small balls for use.

Varnishes for Maps, Prints, etc.

No. 1.—Mastic	5 oz.
Sandarac	2 oz.
Camphor	1 oz.
Alcohol 93 per cent.	16 oz.
No. 2.—Balsam of Canada	2 oz.
Spirit of turpentine	4 oz.

First size the paper with a solution of isinglass, and dry before applying the varnish.

No. 3.—Mounted maps are sized with thin glue and varnished with mastic.

No. 4.—Mastic	6 parts
Sandarac	3 parts
Turpentine	3 parts
Alcohol	32 parts

Put the resins with the alcohol in a copper vessel (tinned inside), place the vessel in a water bath and stir until the resins are dissolved, an operation requiring several hours; then add the turpentine and stir for another hour, after which strain the varnish and set it aside for use.

To varnish maps and paper diagrams, the first and most essential operation is the proper sizing of the paper, as if this be imperfectly done, almost any kind of varnish will penetrate the paper so as to make oil spots. Glue water of the proper consistency is the best protective against the absorption of the varnish. It should be of the right strength, however. If, after being dried, it cracks in bending a corner of the paper, it was not diluted enough. When dry, the map is varnished with a solution of the above mastic, sandarac, or some other colourless resin in turpentine or alcohol, or a mixture of both; experience will show the best consistency in order to lay it on evenly with a brush. In cold weather it requires more of the solvent alcohol.

Transferring Varnish.

Mastic in tears	6½ oz.
Resin	12½ oz.
Pale Venice turpentine	25 oz.
Sandarac	25 oz.
Alcohol	5 pints

Dissolve in a warm place with frequent agitation and strain through muslin.

De Sylvestre's Dextrine.

Dextrine	10 parts
Water	30 parts
Alcohol	5 parts

Dissolve the dextrine in the water and then add the spirit.

Varnish for Prints.

No. 1.—A piece of plate glass is heated, and while yet warm a little wax rubbed over it; water is then poured over the plate and the moistened picture laid thereon and pressed closely down by means of a piece of filtering paper. When dry the picture is removed, and will be found to possess a surface of great brilliancy which is not acquired by the process of mounting.

No. 2.—	Sandarac	20 oz.
	Mastic	8 oz.
	Camphor	1 part
	Alcohol	48 oz.

Previously size with one or two coats of gelatine solution.

Varnish for Dressing Copper for Engraving.

No. 1.—	Yellow wax	1 oz.
	Mastic	1 oz.
	Asphaltum	½ oz.

Melt the whole by heat, pour the mixture into water, and form into balls for use.

No. 2.—A softer varnish for engravers is made with 1 part tallow, 2 parts yellow wax. Or

No. 3.—2 oz. wax, 1 drm. turpentine, 1 drm. olive oil, melted together in a gentle heat.

Spanish Mastic Varnishes.

No. 1.—	Mastic	4 to 5 oz.
	Sandarac	5 to 6 oz.
	Spirits of wine	26 to 30 oz.
	Venetian turpentine	½ to ¾ oz.
No. 2.—	Mastic	5 to 6 oz.
	Sandarac	10 to 12 oz.
	Spirits of wine	26 to 30 oz.
	Venetian turpentine	¼ to ½ oz.

Dutch Varnish for Metals.

Refined sandarac	8¾ oz.
Mastic in grains	8¾ oz.
Anime	4⅕ oz.
Alcohol 96 per cent.	3$\frac{3}{10}$ lb.

Lac Varnish for Water Colour Pictures.

Refined sandarac (powdered)	7 oz.
Mastic (powdered)	1 oz.
Alcohol 96 per cent.	17½ oz.
Venetian turpentine	2$\frac{1}{10}$ oz.

Very Transparent Mastic Varnish for Oil Paintings.

Finest mastic	12½ oz.
Venetian turpentine	1¾ oz.
Camphor	½ oz.
Rectified French oil of turpentine	8 oz.
Alcohol 96 per cent.	2⅕ lb.

PHOTOGRAPHIC VARNISHES.

Retouching Varnish for Photographs.

Shellac	0·035 oz.
Sandarac	0·21 oz.
Mastic	0·21 oz.
Ether	2·7 fl. drm.

Dissolve, and add 2·7 fl. drm. of pure benzole.

Photographers require for their work a lacquer which must possess peculiar properties; on the one hand it must be entirely colourless, must adhere tightly to the glass, and be as hard as possible; and on the other, it must be so constituted as to allow of the plate being retouched with a lead pencil. The most important property required of these varnishes is hardness, as only in cases where the glass negative is coated with a hard varnish is it possible to take

many copies without injury to the plate; and finally, it should be mentioned that these varnishes must also possess a certain degree of elasticity, and must not crack when the varnished plate is put away, as this would be equivalent to a complete spoiling of the photographic negative. As will be seen, quite contradictory properties—hardness and elasticity—are demanded for such varnish, and it is scarcely possible to give equal satisfaction with both of them.

Retouching Varnishes for Negatives (Monkhouse's Formula).

Shellac is placed for 24 hours in a saturated solution of carbonate of ammonia in water, the solution is then poured off and replaced by an equal quantity of pure water, and the fluid is boiled under constant stirring until a complete dissolution has taken place. The proportion between shellac and water should be as 1 to 8. This is poured twice in succession over the negative, which must be thoroughly dry. Retouching can be done more quickly and finer upon this coating than upon any other.

Negative Varnishes.

No. 1.—Sandarac	. . . .	4 oz.
Alcohol	. . . .	20 oz.
Oil of lavender	. . .	3 oz.
Chloroform	. . . .	5 drm.

No. 2.—White hard varnish	. .	8 oz.
Methylated varnish	. .	5 oz.

This will be found a good and cheap varnish if durability is not required, as it is easily rubbed up for retouching upon, and easily cleared off. Very suitable for enlarging negatives that are not to be returned.

No. 3.—Sandarac	. . . .	9 oz.
Turpentine	. . . .	3½ oz.
Oil of lavender	. . .	1 oz.
Alcohol	. . . . .	50 oz.

This may be rubbed down with powdered resin, and gives a splendid surface for retouching.

No. 4.—Sandarac	. . . .	2 oz.
Seedlac	. . . . .	1 to 1½ oz.
Castor oil	. . . .	3 drm.
Oil of lavender	. . .	1½ drm.
Alcohol	. . . . .	18 fl. oz.

No. 5.—Best orange shellac	. .	1½ oz.
Methylated spirit	. . .	1 pint

Keep in a warm place until dissolved, then add a large teaspoonful of whiting or prepared chalk; set aside to clear, and then decant. This is especially recommended for gelatine negatives.

No. 6.—Bleached lac	. . . .	3 oz.
Mastic	. . . . .	1 oz.
Venetian turpentine	. .	$\frac{1}{10}$ oz.
Rectified alcohol	. . .	25 oz.

The negative must be warmed.

VIOLIN VARNISHES.

Matt Varnish.

Mastic	. . . . .	40 grn.
Sandarac	. . . .	160 grn.
Methylated spirit	. . .	4 oz.
Benzol	. . . . .	1½ oz.

Allow the compo to dissolve in any convenient receptacle.

Red Varnish for Violins.

No. 1.—Sandarac	. . . .	6 oz.
Shellac	. . . . .	3 oz.
Mastic	. . . . .	3 oz.
Elemi	. . . . .	1½ oz.
Alcohol 95 per cent.	. .	75 oz.
Cochineal, or dragon's blood		q.s.
Venetian turpentine	. .	3 oz.

Dissolve sufficient cochineal, or dragon's blood, in the alcohol to produce the tone of red required, then digest all the above resins in the spirit by means of a water bath, and add the Venice turpentine.

No. 2.—Copal resin in coarse powder		4 oz.
Glass coarsely pounded	. .	4 oz.
Camphor	. . . .	½ oz.
Alcohol 64 over proof	. .	1 pint

Heat in a water bath with frequent stirring so that the bubbles may be counted as they rise until the solution is complete, and when cold decant the clear portion.

No. 3.—The true Cremona varnish is of unknown formula; its preparation is a lost art. The following is an imitation of it:—

Amber fused	. . . .	2 oz.
Oil of turpentine	. . .	5 oz.
Drying linseed oil	. . .	5 oz.

The following is for a spirit varnish:—

Mastic	. . . . .	1 drm.
Sandarac	. . . .	1 drm.
Lac	. . . .	6½ drm.
Alcohol	. . . . .	5 fluid oz.

Violin Varnish.

The famous Italian violin makers used, it is

said, the following sort of varnish on their instruments:—

Rectified alcohol	½ gall.
Gum sandarac	6 oz.
Gum mastic	3 oz.
Turpentine varnish	½ pint

The above ingredients are put into a tin can by a stove, and frequently shaken until the whole is well dissolved. The liquid is finally strained and kept for use. If upon application it is seen to be too thick, thin with an addition of more turpentine. The wood should be stained before applying the varnish. For a red stain use camwood, logwood or aniline.

Callot's Florentine Hard Varnish.

Melt together equal parts of linseed oil and mastic by heat.

Callot's Soft Varnish.

Linseed oil	4 oz.
Gum benzoin	½ oz.
White wax	½ oz.

Boil till reduced to two-thirds of its bulk.

VARNISHES FOR MISCELLANEOUS PURPOSES.

Varnish for Gilders.

Elemi	1¼ oz.
Mastic	1½ oz.
Sandarac	3 oz.
Spirits of wine	75 oz.

Dissolve and strain.

Varnishes for Making Rubber Balloons Impermeable.

These varnishes are prepared from farinaceous substances, gum tragacanth, or other vegetable gum,

dextrine, sugar, albumen, or collodion prepared without ether, and glue isinglass, or lip-glue. These, after being dissolved, are freed from all undissolved substances by straining them through a hair sieve, as they must be entirely clear. The main point in respect to these varnishes is, that they should form an impermeable but as thin a layer as possible upon the balloon or other article to which they may be applied. The balloon needs to be inflated before it is attempted to coat it with the varnish, which is for the purpose of closing the pores of the envelope and covering them with a film through which the hydrogen gas cannot penetrate. Water or diluted spirits of wine is used as a solvent for the substances. Only the collodion is mixed with a very small quantity of castor oil, so that the film produced upon the balloon may not be too brittle.

No. 1.—Gum	. . . . .	32 parts
Sugar	. . . . .	8 parts
Water	. . . . .	60 parts

The proportions may be changed at will, according as it is desired to have the varnish more or less pliant. The varnish becomes harder if less sugar is used.

No. 2.—Dextrine	. . . . .	28 parts
Best glue	. . . . .	12 parts
Water	. . . . .	60 parts

These proportions may also vary.

Aniline Varnishes.

These varnishes are very useful, as even when in a very thin film the colour is intense. Use alcohol to dissolve the shellac or sandarac. Prepare also an alcoholic solution of the aniline colours; add this to the varnish; warm the object slightly before dipping.

Collodion can also be used to carry the aniline colours, and gives a very thin coating.

Aniline Black Varnish.

Aniline blue	6¾ drm. (av.)
Fuchsine	1¾ drm.
Naphthalin yellow	4½ drm.
Alcohol	1 qrt.

Dissolve the whole of the ingredients in the alcohol during 12 hours, frequently shaking. One application gives an ebony black coat to the object. The varnish if filtered will never form a deposit.

Basket Varnish.

Orange shellac	8 oz.
Yellow resin	1 oz.
Benzoin	½ oz.
Bismarck brown	¼ oz.
Methylated spirit	1½ pint
Vegetable naphtha	½ pint

Varnish for Bamboos.

White shellac	3 oz.
Methylated spirit	10 fluid oz.

Dissolve, and apply to the bamboo with a camel's hair brush. A beautiful transparent coating, which shows the natural colour of the wood, results.

Varnishes for Gun Barrels.

Shellac	1½ oz.
Dragon's blood	3 drm.
Rectified spirit	1 qrt.

Apply after the barrels are browned.

Varnish for Gunstocks.

Shellac	5 oz.
Sandarac	½ oz.
Venice turpentine	1 drm.
Alcohol	2 qrt.

Dissolve.

Glass Varnish.

Glass varnish is the name applied to a solution of sodium silicate or water glass. Fuse together 15 parts of powdered quartz (or of fine sand), 10 parts of potash, and 1 of charcoal, Pulverise the mass, and expose it for some days to the air, treat the whole with cold water, which removes the foreign salts, and boil the residue in 5 parts of water until it dissolves. It is permanent in the air, and not dissolved by cold water. This varnish is used to protect wood from fire.

Gutta-percha Varnish.

Clear 4 oz. gutta-percha in warm water from adhering impurities, dry well, dissolve in 1 lb. rectified resin oil, and add 2 lb. linseed oil varnish boiling hot.

Varnish for School Globes.

Varnish them with white hard varnish. It would be advisable to touch the chafed places up first with a little gum water, in which a little sugar candy is put before revarnishing, to keep the paper from absorbing the varnish.

Varnish to Prepare for Engraving on Glass.

No. 1.—Wax	. . . . .	1 oz.
Mastic	. . . . .	½ oz.
Asphaltum	. . . . .	¼ oz.

Digest in ½ drm. turpentine.

No. 2.—Mastic	. . . . .	7½ oz.
Turpentine	. . .	3½ oz.
Oil of spike	. . . .	2 oz.

No. 3.—Asphaltum	. . . .	1 oz.
Wax	. . . .	4 oz.
Mastic	. . . . .	2 oz.
Turpentine	. . . .	2 drm.

Flexible Varnishes.

No. 1.—India-rubber (cut small) . 1½ oz.
Chloroform, ether, or carbon bisulphide . . . . 20 fl. oz.

Digest without heat until the solution is complete. This dries rapidly.

Electrical Varnish.

Orange shellac, alcohol.

Dissolve ; to give whatever colour is desired add pigments—red and black being mixed for brown, red and blue for purple, yellow ochre or chrome yellow for yellow, calcined lampblack for a dead black.

Guaiacum Varnish.

Shellac . . . . . 2 oz.
Gum guaiacum . . . 2 oz.
Methylated spirit . . . 18 oz.

Powder the gum, dissolve in the spirit, filter, and add the shellac. Keep in a jar surrounded by warm water until dissolved.

Varnish for Fans.

Mastic . . . . . 7½ oz.
Sandarac . . . . 20 oz.
Alcohol . . . . . 175 oz.
Venice turpentine . . . 10 oz.

Dissolve in the alcohol, and then add the turpentine.

To Varnish Engravings and Drawings.

Size with weak isinglass size (1 oz. to the pint of water) ; give two coats, then varnish with mastic varnish.

Ferrotype Varnish.

White shellac . . . 12 parts
Alcohol 95 per cent. strong . 58 parts

Dissolve, and add a few drops of oil of lavender.

Varnishes for Labels.

No. 1.—Camphor . . . . . 1 oz.
Resin . . . . . 2 oz.
Sandarac . . . . . 4 oz.
Alcohol . . . . . 24 oz.

Dissolve.

No. 2.—Canada balsam and turpentine in equal parts

Size the labels with gum water before varnishing.

No. 3.—Sandarac . . . . . 53 oz.
Mastic . . . . . 22 oz.
Camphor . . . . . 1 oz.
Lavender oil . . . . . 8 oz.
Venice turpentine . . . . 4 oz.
Ether . . . . . 6 oz.
Alcohol . . . . . 40 oz.

Digest all in the spirit until dissolved. The result is a limpid, colourless, brilliant varnish, which dries quickly, and is not too brittle.

No. 4.—African copal . . . . . 6 oz.
Powdered glass . . . . 6 oz.
Camphor . . . . . 1½ oz.
Ether . . . . . 25 oz.
Alcohol . . . . . 6 oz.

Powder the copal, and put it in a bottle with the glass, camphor and ether, close well, and digest several weeks, frequently shaking; then add the alcohol, shake, and digest another two weeks, then pour off the clear portion of the varnish. Size the labels with a solution of isinglass in spirit 1 part and water 3 parts.

Varnish for Plaster of Paris Casts.

White soap . . . . . ½ oz.
Wax . . . . . ½ oz.
Water . . . . . 2 pints

Boil together for a short time in a clean vessel, let the mixture cool, and then apply with a soft

brush. It does not soak in; it dries readily, and its effect may be heightened by lightly using a silk handkerchief, and rubbing therewith.

Shellac Varnish.

Shellac	60 grn.
Alcohol	63 grn.

Dissolve in a gentle heat until quite thick.

Shellac Varnish for Rubber Shoes.

Powder shellac, and digest in ten times its weight of flower of ammonia. The mixture takes a long time for dissolution. Mixed with lampblack, this varnish is useful for goloshes or overshoes.

Varnish for Pocket-Books.

Mastic in tears . . .	6 oz.
Coarsely powdered glass sifted from the dust . . .	3 oz.
Spirits of wine of 40 per cent. .	32 oz.

Dissolve by aid of sand bath, let the mixture come to the boil, stir well, and strain through cotton cloths. Be careful that the mixture does not become overheated and inflame.

N.B.—It is very dangerous for any person except a skilled workman to attempt to make this varnish. —Ed.

Electric Insulating Varnishes.

No. 1.—For large coils. Cotton-covered wires are steeped in melted paraffin to increase their insulation. Large electro-magnet coils have a double covering of cotton, and the outer layer is coated with a thick varnish of shellac dissolved in alcohol.

No. 2.—Sealing-wax dissolved in alcohol, and painted on with a brush in successive thin layers, say four or five.

No. 3.—For galvanometer coils. Gum copal dissolved in ether, painted over each layer of wire, and dried on a stove.

Waterproof Varnishes for Cart Covers.

No. 1.—For waterproofing textile fabrics, boil together 2 quarts linseed oil and ½ lb. flour of sulphur.

No. 2.—5 lb. oxide of lead, 2½ lb. lampblack, 6¾ oz. sulphur, 12½ lb. india-rubber dissolved in turpentine. Boil until thoroughly mixed.

No. 3.—Soften 4 oz. india-rubber in ½ lb. of oil of turpentine; then add 2 lb. boiled oil, and boil for two hours over a slow fire. When dissolved, add 6 lb. of boiled linseed oil and 1 lb. of litharge, and boil until an even liquid is obtained. Apply warm.

Imitation Shellac Varnish.

(Used by furniture dealers.)

Sandarac	1½ lb.
Pale resin	1½ lb.
Benzine	2 gall.

Dissolve by gentle heat. Dries quickly.

Wax Varnish (to preserve Statues and Marble Exposed to Air).

Melt 2 parts wax in 8 parts pure essence of turpentine. Apply, and spread evenly so as not to destroy the lines of the figures. This varnish may be used upon statues which have been cleansed with water and washed with hydrochloric acid; but they must be perfectly dry when the application is made.

Spirit Gold Lac Varnishes.

No. 1.—	Shellac	33 oz.
	Gamboge	66½ oz.
	Dried saffron	4 oz.
	Alcohol	133 oz.

Powder the resin and rub it up with the saffron. Heat by water bath.

No. 2.—Shellac	. . . . .	16½ oz.
Dragon's blood	. . .	8 oz.
Turmeric	. . . . .	8 oz.
Gamboge	. . . . .	4 oz.
Alcohol	. . . . .	100 to 133 oz.

Treat as in No. 1.

No. 3.—Shellac	. . . . .	16½ oz.
Dragon's blood	. . .	2 oz.
Saffron	. . . . .	1 oz.

Digest in 400 to 600 oz. alcohol for eight days in the sun, and then filter.

Oil of Turpentine Varnishes.

These varnishes are usually prepared in the same manner as spirit varnishes, but as turpentine is not so volatile (i.e. its boiling point is higher) as alcohol and other solvents used in volatile varnishes, it is not necessary to use the same precautions against the loss by evaporation of the solvent. A general practice for the dissolution of resins in turpentine is to place them in a linen bag, and suspend them in the neck of the vessel, which should be four-fifths filled with oil of turpentine. The vessel should then be placed up to about a quarter of its height in sand piled upon the plate of an ordinary stove. A glass funnel containing a sponge, which has to be moistened from time to time, is placed upon the bottle. The loss of oil caused by evaporation is so small that it need not be taken into consideration. A good substitute for a sand bath can be improvised out of an old frying-pan, the long handle of which serves very conveniently to remove the bath and containing vessel from the fire if required. When only a gentle heat is required, a hanging frying-pan, such as are sold in country districts, is very convenient, as this

can be suspended from the iron peg that draws out over the fire in a country-made grate. An old iron saucepan also forms a good vessel for improvising a water bath.

Dammar Varnish.

Dammar resin . . .	40 to 45 oz.
Oil of turpentine . . .	50 to 60 oz.

The preparation of this varnish requires a peculiar treatment, namely, dammar resin can only be dissolved in oil of turpentine when that fluid contains no water. If water is present, the resin is absolutely insoluble. The most economical and rational means of dissolving dammar resin in turpentine is to proceed as follows:—First melt the resin in a heat of 105° to 110° C. (221° to 230° F.), and then add a small quantity of oil of turpentine and bring the latter to the boiling point; then it will form a very thick solution, furnishing at once a ready varnish when reduced with a sufficient quantity of oil of turpentine.

Caoutchouc Varnishes.

Caoutchouc	1 part
Bisulphide of carbon . .	10 parts

Cut up the caoutchouc in small pieces, put it in a bottle, cover with the liquid, cork up, and let the bottle stand in a cool place, or there will be danger of serious explosion and fire. The caoutchouc swells up very much, but dissolves only partly, and after standing for a long time, forms a clear solution over a slimy sediment. Pour off the solution very carefully. Benzole dissolves caoutchouc better. Gradually add some of the fluid to the caoutchouc until the latter is changed into a jelly; then reduce the mixture with light tar oil (having a density of 0·84 to 0·85), and filter. The most complete solution is obtained by pouring benzine over the pieces of caoutchouc after

they have been treated with bisulphide of carbon, and mixing the solutions together.

This varnish dries very rapidly, leaving a very thin film behind ; thus it is useful for coating metal, paper, etc. The layer of varnish has neither colour nor lustre, is therefore invisible, and articles varnished with it can be cleaned with a moist sponge. If a tissue is dipped into this varnish, or painted over with it, the stuff will be made waterproof, and fine cotton or silk goods treated in this manner assume a very peculiar transparent appearance. If this varnish be applied to burns, the pains of them cease; as it excludes the air from them, and then they heal quickly.

This varnish is one of the best means of rendering articles waterproof. Matches and rockets dipped several times into this varnish may be in water for hours without losing their inflammability.

Hard Caoutchouc Lacquer Varnish.

Old combs of hard caoutchouc, or other waste caoutchouc, can be utilised in preparing this excellent lacquer, which may be used for all purposes. Melt the hard caoutchouc in small quantities in an iron pot, keep constantly stirring meanwhile to prevent the mass from burning to the pot. When all has been melted, pour the fluid mass upon a tin plate, and break it into pieces after it has become cold. Put these pieces, which resemble glossy black pitch, into a bottle with five to ten times their quantity of rectified oil of turpentine. Instead of using oil of turpentine alone, a mixture of equal parts of this and benzole may also be used, which will dissolve the caoutchouc in a very short time. When the best part of the mass is dissolved, pour it off from the sediment carefully, and a dark brown lacquer is obtained, which furnishes an excellent coating for metal,

and, when repeated often, gives it a glossy black colour resembling that of the hard caoutchouc itself.

Coal Asphaltum Lacquer Varnish.

Take 100 parts of coal-tar pitch and melt together with 40 parts of colophony, and then mix with 20 parts of linseed oil varnish. When this has been intimately mixed together, 40 parts of oil of turpentine, and a similar quantity of tar varnish oil, are added to the mass. The mixture is ready when a sample rubbed upon a glass plate solidifies to a glossy black colour in a quarter of an hour.

If the sample should show no lustre, a few pounds of tar-oil varnish are added to the mass, and thoroughly mixed with it.

Another Tar Asphaltum Lacquer.

West Indian copal	30 lb.
American pine resin	30 lb.
Mineral asphaltum	30 lb.
Tar asphaltum	30 lb.
Yellow wax	6 lb.
Venetian turpentine	6 lb.

Best Body Copal Varnish for Coach-makers.

Fine African copal	4 lb.
Clarified oil	1 gall.

Boil very slowly for four or five hours until quite stringy; mix off with 1¾ gall. of turpentine, strain, and store for use.

White Copal Varnish.

Copal	4 oz.
Camphor	½ oz.
White drying oil	3 oz.
Essential oil of turpentine	2 oz.

Powder the copal, mix the camphor and drying oil, then heat on a slow fire, and add the oil of turpentine and strain.

Copal Varnish.

Camphor	1 part
Ether (by weight)	12 parts
Clear copal	4 parts
Absolute alcohol	4 parts
Essence of turpentine	¼ part

Dissolve the camphor in the ether, and add the copal to this, powdered fine. Let the mixture digest in a warm place, with frequent shakings; then add the alcohol and essence of turpentine. A viscid, almost homogeneous liquid should result. Set this aside for several days, when it will separate into two layers, the lower of which contains the most copal; but the higher stratum will be found to give the most brilliant varnish, although it is at the same time as limpid as water.

Copal Varnish with Ammonia.

Powder the copal, and pour ammonia over it until the whole mass swells up. Heat this to about 100° F., then add alcohol until the mixture is of the desired consistency.

Anti-rust Varnish.

Resin	12 parts
Sandarac	18 parts
Gum lac	6 parts
Essence of turpentine	12 parts
Rectified alcohol	10 parts

Powder the first three ingredients, and digest them by a regular heat until melted; then add the turpentine, very gradually stirring all the while. The mixture should be digested until the resins are dissolved; then add the alcohol. Filter through fine cloth, and preserve in well-stoppered bottles or Noakes' paint tins.

Asphalt Varnish for Metals.

No. 1.—Boil ordinary tar until on cooling it

shows a tendency to harden ; add about $\frac{1}{5}$ asphaltum, shaved fine, until all is melted, then cool.

No. 2.—Boil coal-tar until it shows a disposition to harden on cooling. To ascertain this, rub a little on a piece of metal ; then add about 20 per cent. of lump asphalt, stirring it with the boiling tar until all the lumps are melted, when it can be allowed to cool and kept for use. This makes a very bright varnish for sheet metals, and is cheap and durable.

Asphalt Varnish for Microscopists.

Dissolve $\frac{1}{2}$ drm. caoutchouc in mineral naphtha, and then add 4 oz. asphaltum, using heat if necessary.

Bronze Varnish for Small Castings.

Dissolve 10 parts diamond fuchsine, 5 parts Hofmann's methyl violet in a water or a sand bath, in 100 parts alcohol 95 per cent. overproof ; then add 5 parts benzoic acid, and boil for five to ten minutes, until the whole has acquired a brilliant bronze colour. This varnish adheres firmly to all articles, possesses a beautiful gloss, and is very durable.

N.B.—The expression "a part" or "parts" in the foregoing formulas means any weight or quantity to serve as a measure for all the ingredients named. Thus you can read "part," or "ounce," or "pound," or "gallon," for the first ingredient, and all after it, according to the quantity you wish to produce.—EDITOR.

Varnish for Mechanics.

Resin	5 oz.
Dragon's blood . . .	1 oz.
Gamboge	1 oz.
Gutta-percha	2 oz.
Shellac	1 part
Volatile tar oil . . .	40 parts

This lacquer is very useful, and largely used for many purposes.

Varnish for Foundry Patterns and Machinery.

A varnish has been patented in Germany for the above purpose, which it is claimed dries as soon as put on, gives the pattern a smooth surface, thus insuring an easy slip out of the mould, and which prevents the patterns from warping, shrinking or swelling, and is quite impervious to moisture. This varnish is prepared as follows: 30 lb. shellac, 10 lb. Manila copal, and 10 lb. Zanzibar copal are placed in a vessel which is heated externally by steam, and stirred during four to six hours, after which 150 pints of the finest potato spirit are added to the whole, heated during four hours to 87° C. This liquid is dyed by the addition of orange colour, and can then be used for painting the patterns.

Dyed Polishes.

The methods of dyeing polish or varnish are as follows: for a red, put a little alkanet-root or camwood dust into a bottle containing polish or varnish; for a bright yellow, a small piece of aloes; for a yellow, ground turmeric or gamboge; for a brown, carbonate of soda and a very small quantity of dragon's blood; and for a black, a few logwood chips, gall-nuts and copperas, or by the addition of gas-black.

The aniline dyes (black excepted) are very valuable for dyeing polishes, the most useful being Turkey-red, sultan-red, purple and brown. A small portion is put into the polish, which soon dissolves it, and no straining is required. The cheapest way to purchase these dyes is by the ounce or half-ounce. The penny packets sold by chemists are too expensive, although a little goes a long way.

FORMULAS FOR MAKING AND USING JAPANS.

The process of hardening and finishing varnished or lacquered work by the aid of heat constitutes the chief feature of the japanner's art.

In practice, the work to be japanned is first thoroughly cleansed and dried. If of wood, composition, or other porous material, it is given, after being warmed, several coats of wood filler, or whiting mixed up with a rather thin glue size, and is, when this is hardened, rubbed down smooth with pumice stone. It is then ready for the japan grounds.

If the surface thus varnished is heated for some time to a temperature of from 250° to 300° F. or higher, it is found that the whole of the solvent, or vehicle of the gums or resins in the varnish, is soon driven off, and the gummy residue becomes liquefied or semi-liquefied, in which state it adapts itself to all inequalities, and, if the coating is thick enough, presents a glossy surface, which it retains on cooling. This process of drying out and fusion secures a firm contact and adhesion of the gums or resins to the surface of the substance varnished, and greatly increases the density of the coating, which enables it to resist wear and retain its gloss longer.

Ordinary Black Japan Ground.

No. 1.—Mix shellac varnish with either ivory-black or lampblack, but the former is preferable. These may be always laid on with the shellac varnish, and have their upper or polishing coats of common seedlac varnish.

No. 2.—A common black may be made by covering a piece of work with drying oil, and putting the work into a stove not too hot, but of such a degree

as will change the oil black without burning it, gradually raising the heat, and keeping it up a long time. This requires no polishing.

Superior Black Japan Ground.

Amber	12 oz.
Asphaltum purified	2 oz.
Boiled oil	½ pint
Resin	12 oz.
Oil of turpentine	16 oz.

Fuse the gum and resin and asphaltum, add the hot oil, stir well together, and when cooling add the turpentine.

Recipes for Common Black Japan Ground.

No. 1.—Asphaltum	1 lb.
Balsam of capivi	1 lb.
Oil of turpentine	q.s.

Melt the asphaltum over a fire, and having previously heated the balsam, mix that with the asphaltum; then remove the vessel from the fire, and put in the turpentine.

No. 2.—Moisten good lampblack with oil of turpentine, and grind it very fine with a muller on a stone plate; then add a sufficient quantity of ordinary copal varnish, and rub well together.

No. 3.—Asphaltum	3 oz.
Boiled oil	1 gall.
Burnt umber	8 oz.
Oil of turpentine	q.s.

Melt the asphaltum, stir in the oil previously heated, then the umber, and, when cooling, thin down with the oil of turpentine.

Japan Black for Metals.

Umber	12 oz.
Asphaltum	2 oz.

Fuse by heat, and add ½ pint boiled oil and 2 oz. resin ; when cooling, add 16 oz. oil of turpentine.

Japan Black for Leather.

Burnt umber	4 oz.
True asphaltum . . .	2 oz.
Boiled oil	2 qrt.

Dissolve the asphaltum by heat in a little of the oil, add the burnt umber ground up in oil, and the remainder of the oil ; mix, cool, and thin with turpentine. This composition is very flexible.

A White Japan Ground

is prepared from copal varnish and zinc white or starch. To form a hard perfect white ground is no easy matter, as the substances which are generally used to make the japan hard have a tendency, by a number of coats, to look or become dull in brightness. One white ground consists of the following composition : Flake white of lead is washed over and ground up with ⅙th of its weight of starch, then dried, and mixed with the finest gum, ground up in parts of 1 oz. gum to ½ oz. of rectified turpentine, mixed, and ground thoroughly together. This is to be finely laid on the article to be japanned, dried, and then varnished with 5 or 6 coats of the following : 2 oz. of the finest seedlac to 3 oz. of gum anime, reduced to a fine powder, and dissolved in 1 quart of alcohol. The lac must be carefully picked. For a softer varnish than this, a little turpentine should be added, and less of the gum. A very good varnish, and not brittle, may be made by dissolving gum anime in nut oil, by boiling it.

Aniline Colours for Japanning.

Many of the clear varnishes and oils may be coloured directly with some of the aniline dyes by mixing the colouring material with the solvent used.

These dyes do not hold their colour very well at high temperatures.

Black Inflexible Japan for Leather.

Shellac	1 oz.
Wood naphtha	¼ oz.
Lampblack to colour.	

Dissolve by allowing to stand for some time in a tank or bottle.

Carriage Japan.

Raw linseed oil	¼ gall.
Litharge	¼ lb.
Red lead	2 lb.
Black oxide of manganese	1 lb.
White gum lac	3¼ oz.

Set the oil over the fire and bring to the boiling point, add by degrees litharge and red lead alternatively and slowly; add the gum, and when this is melted put in the manganese, and keep the whole in rapid motion from the time the oil is 200° F. until the making is finished. When the mixture is cool enough to bear the finger in a moment, add from 2 to 3 gall. of spirit of turpentine.

Transparent Japan.

Oil of turpentine	8 oz.
Oil of lavender	6 oz.
Camphor	1 drm.
Bruised copal	2 oz.

Dissolve. This is used for japanning tin. Quick-drying copal varnish is usually substituted.

To Japan Old Teatrays.

First clean them thoroughly with soap and water and a little rotten-stone, then dry by wiping and exposure at the fire. Now get some good copal varnish, mix with it some bronze powder, and apply with a brush to the denuded parts; after which set

the teatray in an oven at a heat of 212° F. to 300° F. until the varnish is dry. Two coats will make it equal to new.

Black Japan for Tin Lanterns.

Asphaltum	1½ oz.
Boiled linseed oil	4 pints
Burnt umber	4 oz.

Heat till well mixed, and, when cool, add turpentine till of a proper consistency.

Japan Flow for Tin.

Spirit of turpentine	3 qrt.
Balsam of tolu	3 oz.
Linseed oil	¾ pint
Acetate of lead	3 oz.
Balsam of fir	3 oz.
Sandarac	1½ lb.

Put all these materials, except the turpentine, in a suitable vessel, place over a slow fire at first, then incorporate by stirring. Add the turpentine when the mixture has cooled to 80° F., or it may fire.

The Tortoiseshell Japan.

This kind of japan is very pretty, and comparatively easy to manufacture. The work is first coated with a japan made by boiling 2 pints linseed oil, to which 4 oz. of water has been added, till it becomes thickened; the mixture is then strained and further boiled, till it becomes of a pitchy consistency. This is mixed with turpentine to a workable consistency, and then applied. On a thoroughly dry coating of this japan lay a quantity of vermilion spots, to represent the clear portion of the shell. The vermilion japan is made by adding vermilion to shellac varnish; it should be laid on thinly and dried. The whole surface is then finally coated with a thin layer of the above-described brown japan, still further

diluted with turpentine. A long course of stoving will be necessary, to thoroughly harden the japan.

Japan Finishing.

The finishing part of japanning lies in laying on and polishing the outer coats of varnish, which is necessary in all painted or simply ground-coloured japan work. When brightness and clearness are wanted the white kind of varnish is necessary, for seedlac varnish, which is the hardest and most tenacious, imparts a yellow tinge. A mixed varnish, we believe, is the best for this purpose, that is for combining hardness and purity. Take then, 3 oz. of seedlac, picked very carefully from all sticks and dirt, washing it well with cold water, stirring it up, pouring it off, and continuing the process until the water runs off perfectly clear; dry it, and then reduce it to powder, and put it, with a pint of alcohol, into a bottle, of which it must occupy only two-thirds of its space. This mixture must be shaken well together, and the bottle allowed to stand (being corked) until the lac be dissolved. When this is the case the clear liquor must be poured off,and the remainder strained and poured into a well-stoppered bottle. The manner of using this seedlac varnish is the same as that before described, and a fine polishing surface is made by mixing this with pure white varnish. The pieces of work to be varnished for finishing should be placed near a stove, or in a warm dry room, and one coat should be perfectly dry before the other is applied.

Black Varnish for Tinsmiths.

Fine lampblack, or Frankfort black, ground up with spirit and added to an alcoholic solution of shellac, or else to a solution of 1 part of asphaltum, digested in 3 parts of oil of turpentine, and then add some linseed oil and minium.

Gold Varnish for Iron.

Linseed oil	90 parts or more
Tartar	60 parts
Yolk of egg, hard boiled	60 parts
Aloes	15 parts
Saffron	¼ part
Turmeric	$\frac{1}{10}$ part

Digest all together, and when fluid apply to the iron.

LACQUERS AND LACQUERING.

Gold Lacquer for Tin Plate.

Clean the tin plate carefully, and apply the following mixture with a brush: 3 parts dried copal lacquer, 1½ part linseed oil. Dry the plates, then lacquer. Will not crack nor lose its lustre if the tin plates are bent or hammered.

Red Lacquer for Tin Ware.

Alcohol	1 part
Seedlac	3 oz.
Aniline colours to suit	2 drm.

Mix, and let the whole remain for a couple of weeks, agitating at least once a day. When properly combined strain the fluid through muslin.

Another.

Turmeric	6 drm.
Saffron	3 scruples
Sandarac	3 drm.
Canada balsam	3 drm.
Mastic	4 drm.
Oil of turpentine	120 minims
Alcohol	12 oz.

Dissolve the first five ingredients in the alcohol, then add the turpentine.

Another.

Alcohol	1 part
Red sanders-wood	½ oz.
Turmeric	1 oz.
Shellac	2 oz.

Another.

Use as a body, shellac or sandarac varnish, to make it adhere; add to it ½ part of boracic acid to 1000 parts lacquer. Colour with suitable pigments, such as Prussian blue, carmine, gamboge, or other turpentine colours. Aniline colours may be used, but they fade. By adding a little castor oil the lacquer becomes tougher and more pliable.

Lacquer for Steel.

Mastic	8 parts
Camphor	4 oz.
Sandarac	12 oz.
Elemi	4 oz.
Alcohol	9 oz.

Black Lacquer for Zinc.

Equal parts of chlorate of potash and sulphate of copper. Dissolve in 36 times as much warm water, and allow the solution to cool. Then dip the cast-zinc article in the solution until quite black; rinse off in water, and dry. Even before it is dry the black coating adheres to the article, so that it may be wiped dry with a cloth. If coffee-coloured spots appear during the operation the solution is applied to them a second time, and after a while they turn black, when the article should be washed and dried. On rubbing, the coating acquires a glittering appearance, like indigo, which disappears on applying a few drops of linseed oil varnish, or "wax milk," and the zinc then has a deep black appearance and gloss. The wax milk is prepared by boiling 1 part of yellow soap and 5 of Japanese wax in 21 of water until the soap dissolves. When cold it has the consistence of a salve, and will keep in closed vessels

for an indefinite time. It can be used for polishing carved wood, and for waxing ball-room floors, as it is cheaper than the solution of wax in turpentine, and does not stick or smell disagreeably like the latter.

Black Lacquer for Iron and Steel.

A beautiful black polish is obtained by boiling 1 part of sulphur with 10 of oil of turpentine. A coat, as thin as possible, is laid on the article to be polished, which is then held over the flame of an alcohol lamp until the black polish makes its appearance.

Anti-corrosive Lacquer for Spring Steel.

Bars of spring steel, if coated with the following preparation, are not acted upon by acids, alkalies, chlorine or steam:—50 parts china clay, 10 of sandarac, 3 of elemi, 2 of gun-cotton, ½ of camphor, and 5 of oil of lavender (from *Lavandria spica*); the whole mixed with 100 parts of alcohol.

Lacquer for Gold Surfaces.

Turmeric	4 oz.
Gamboge	1 oz.
Shellac	3 oz.
Sandarac	14 oz.
Common turpentine varnish	1 pint
Alcohol	2 qrt.

Macerate the turmeric in the alcohol for a week, then add the other solid ingredients and dissolve by heat of a water bath, and, finally, add the turpentine varnish. The above is a yellow lacquer. For a red one use 14 oz. annatto instead of the turmeric, and 4 oz. dragon's blood instead of the gamboge.

Or

Turmeric	½ oz.
Dragon's blood	½ drm.
Red sanders-wood	1 scruple
Hay saffron	2 scruples
Shellac	1 oz.
Sandarac	2 oz.
Mastic	2 drm.
Canada balsam	2 drm.
Spirits of turpentine	1½ drm.
Alcohol	8 oz.

Dissolve the colouring matter in the alcohol, then put in the resin, and, when dissolved, add the turpentine. Colour the lacquer with dragon's blood and saffron to the required depth.

Operation of Lacquering Brass.

Have the lacquer in a jar with a wire across the top, so as to allow the surplus lacquer being squeezed off the brush by scraping it against the wire, just as you would against the edge of a cup. The wire should be kept clean to keep it from clogging. Do not make the brasswork too hot, but warm until the sweat or steam disappears. To obtain the rich colour put on successive coats of lacquer, warming the article between each. Do not try to do this in one operation, and so lay it on too thick. Hold the brush between the thumb and finger of the right hand, and apply by light feather strokes. Suitable holders should be made for round work, terminals, etc., whereby they can be twisted round between finger and thumb of the left hand. If the work is made too hot the lacquer will turn brown, and have to be washed off. This is accomplished by using spirit, or by leaving the article in strong solution of soda over night. The brushes used should be of soft camel hair, flat, and trimmed on a board, with a sharp knife, to a thin straight edge. A good

brush is half the battle. If these get hard, press on a hot iron plate and then dip in lacquer, when they will be in nice working order.

Method of Lacquering Instruments.

Clean the brasswork of instruments by boiling in caustic soda water, and then soak in alcohol, and wipe. For aluminium lacquer, dissolve bleached shellac in 95 per cent. alcohol. Heat all the work to 212° F. before applying the lacquer, use a broad camel's-hair brush, work quickly, and place the work in a hot oven or over a spirit-lamp for a few minutes to glaze the surface of the lacquer. To deaden the gloss on instrument work, clean perfectly free from grease with soda water, wash, and dip in a bath of 1 part nitric acid and 49 water for from two to five seconds, wash off the acid in hot water, dip again in hot soda water, and in hot clean water, to leave the surface perfectly free.

To Re-lacquer Brass.

Strong sulphuric acid . .	2 parts
Water	1 part
Red fuming nitrous acid .	1 part

Mix these in the open air, as the gas evolved on mixing the nitrous acid with the sulphuric acid and water is of a suffocating character. This will pass off in the course of an hour or so, during which time the mixture may be stirred with a glass rod. The bright gilded effect produced on the brass by this mixture is so good that any one trying it will not return to the use of nitric acid alone. The subsequent washing, drying and lacquering cannot be done too soon after the dipping, as the articles tarnish rapidly if kept unlacquered.

Green Transparent Lacquers.

Strong vinegar	1 qrt.
Mineral green	½ oz.
Raw water	½ oz.
Sal-ammoniac	½ oz.
Gum arabic	½ oz.
French berries	2 oz.
Copperas	½ oz.

Dissolve the above in an earthenware pipkin over a full fire, allow to cool, and then filter.

Gold-coloured Lacquer for Dipped Brass.

Seedlac	6 oz.
Amber	2 oz.
Gum-gatter	2 oz.
Red sanders-wood	24 grn.
Dragon's blood	60 grn.
Oriental saffron	36 grn.
Powdered glass	4 oz.
Alcohol	36 oz.

Bronze Lacquers.

Shellac	12 oz.
Sandarac	8 oz.
Alcohol	3 qrt.
Dragon's blood and turmeric to produce tone required.	

Lacquers for Brass.

No. 1.—Seedlac	1 oz.
Dragon's blood	1 oz.
Annatto	1 oz.
Gamboge	1 oz.
Saffron	¼ oz.
Alcohol	2½ pints

Dissolve the colouring matters in a little of the alcohol separately, then mix all together in the dissolved resin and shake well to thoroughly incorporate.

No. 2.—Shellac . . . . . 3 oz.
Gum juniper . . . . . 3 oz.
Turmeric . . . . . 4 oz.
Annatto . . . . . ½ oz.
Alcohol . . . . . 3 oz.

Same as No. 1.

No. 3.—Seedlac . . . . . 3 oz.
Amber (powdered) . . . 1 oz.
Copal (powdered) . . . 1 oz.
Dragon's blood . . . 20 grn.
Extract red sanders-wood . ¼ drm.
Oriental saffron . . . 18 grn.
Coarsely powdered glass . 2 oz.
Absolute alcohol . . . 20 oz.

Same as No. 1. The product is most excellent.

No. 4.—Seedlac . . . . . 3 oz.
Amber . . . . . 2 oz.
Extract red sanders-wood . ½ drm.
Gamboge . . . . . 2 oz.
Dragon's blood . . . 1 drm.
Saffron . . . . . ½ drm.
Alcohol . . . . . 2 pints, 4 oz.

No. 5.—Sandarac . . . . . 2 oz.
Elemi . . . . . 2 oz.
Seedlac . . . . . 1 oz.
Turmeric . . . . . 6 drm.
Saffron . . . . . 15 grn.
Gamboge . . . . . 6 drm.
Alcohol (hot) . . . . 1 pint

Digest the turmeric and saffron in the whole of the alcohol, filter, and then add the other ingredients.

For Optical Work.

No. 3 recipe, above, is the best. If it comes off, either the metal was not clean when applied or else it was put on cold. The metal should be heated to

just such a point that it dries as fast as the brush passes over it. Circular things may be done in the lathe, going quite slowly, and working a good body by going over several times.

To Lacquer Microscope Work.

Use pale gold lacquer of the best quality, and see that the things are sufficiently hot before putting on the lacquer. Heat after lacquering and it will stand well. The best lacquering is affected by damp.

Waterproof Caoutchouc Lacquer.

Dissolve the caoutchouc in linseed oil by prolonged heating; pour the solution into tall bottles, and let it stand for a few weeks to become clear. The clear solution can then be rubbed together with any kind of mineral colours, and furnishes a coating which will excellently resist the influence of the weather. When finely divided blacklead is used instead of mineral colours a mass is obtained which, in a dry state, will have the appearance of steel.

Asphaltum Lacquer for Leather.

Mineral asphaltum	5 oz.
Tar asphaltum	5 oz.
American pine resin	5 oz.
Wax	1 oz.
Paraffin	1½ oz.
Good linseed oil varnish	20 oz.
Paris blue	1 oz.
Oil of turpentine	5 oz.
Benzole	5 oz.
Methyl violet	5½ oz.
Strong alcohol	5 oz.

Mix the methyl violet in the alcohol, and apply this to the leather before laying on the lacquer.

Then mix the asphaltum, pine resin, wax and paraffin together, and melt by heating, and to the melted mass add the linseed oil and the Paris blue; then heat the fluid, continually stirring it, until it commences to give off heavy vapours. From this time samples of it must be tested. If a cooled-off sample be drawn out into fine threads and leaves no fat-like edge when dropped hot upon a piece of paper, the mass is allowed to cool off as much as possible without becoming viscid, and then the oil of turpentine and benzole are added to it, and the whole well mixed by stirring.

Fat Resin Lacquer.

Asphaltum	5 oz.
Colophony	20 oz.
Oil of turpentine	10 oz.
Linseed oil varnish	15 oz.

Dissolve the asphaltum and colophony in the turpentine, and then add the oil.

Copal Lacquer for Bookbinders.

West India copal	5 oz.
Mastic	1 oz.
Oil of turpentine	5 oz.
Spirits of wine	5 oz.

Dissolve by heat of sand bath, at a very low temperature.

Lacquer for Terra-Cotta.

Mastic	1 oz.
Shellac	10 oz.
Venetian turpentine	2½ oz.
Alcohol	30 oz.

Dissolve by allowing to stand in a corked bottle or jar.

Lacquer for Gilt Articles.

Amber	2 oz.
Seedlac	½ oz.
Sandarac	2 oz.
Dragon's blood	½ oz.
Gamboge	½ oz.
Sanders-wood	½ oz.
Saffron	½ oz.
Alcohol	20 oz.

Separately dissolve the colouring matter in a little alcohol, and mix together; in the remainder of the alcohol dissolve the seedlac, and mix with the coloured tincture.

Lacquer for Carriages.

East India copal	1 oz.
Oil of turpentine	1½ oz.
Linseed oil	1½ oz.

Dissolve the copal in the oil by heat, and then add the turpentine.

Lacquer for Sign Painters.

Elemi	2 oz.
Mastic	2½ oz.
Sandarac	5 oz.
Shellac	5 oz.
Oil of turpentine	2 oz.
Venetian turpentine	2 oz.
Spirits of wine	50 oz.

Dissolve the resins in the alcohol, mix the two turpentines together, and then add it to the alcoholic solution.

Black Amber Lacquer for Metals.

Amber chips	10 oz.
Finest asphaltum	18 oz.
Linseed oil	10 oz.

Melt the amber in an iron vessel, and, having boiled 5 oz. of the linseed oil, pour it in and stir and heat to a point where they commence to evolve

heavy vapours. In a separate vessel melt the asphaltum, and pour the other 5 oz. of linseed oil (boiling hot) on it; stir well, and then put both fluids into one vessel and well stir while heating together. This lacquer has the valuable quality of retaining its lustre even after frequently repeated washings, and does not crack off. In lacquering metal articles with it, they should be heated pretty hot, and the lacquer also used in the hot state, and then applied in a very thin layer. Copal may be used instead of amber. The lacquer so prepared is not so durable. although cheaper.

Black Lacquer for Leather.

Shellac	1 part
Turpentine	5 parts
Alcohol	40 parts
Extract of logwood	½ part
Bicarbonate of soda	$\frac{1}{10}$ part

Photographer's Lacquer.

A hard lacquer for photographers' negatives.

No. 1.—Sandarac	20 parts
Venetian turpentine	2 parts
Oil of lavender	2½ parts
Ether	2½ parts
Pure alcohol	50 parts

Digest the resin in the mixed fluid.

No. 2.—Mastic	1 oz.
Bleached shellac	5 oz.
Oil of turpentine	2 oz.
Alcohol	30 oz.

No. 3.—Amber	1 oz.
Copal	1 oz.
Benzole	2 oz.
Spirits of wine	15 oz.

No. 4.—Amber	. . . . .	1 oz.
Copal	. . . . .	1 oz.
Mastic	. . . . .	1 oz.
Petroleum naphtha	. .	5 oz.
Spirits of wine	. . .	10 oz.

In preparing lacquers for photographers' use only the purest materials should be used, as the lacquer should be entirely colourless.

Colourless Lacquer Destitute of Gloss (Hayne's Formula).

Ether	56 parts
Benzole	24 parts
Sandarac	4 parts
Canada balsam . . .	1 part

First dissolve the sandarac in the ether, then add the remaining fluids, and allow the mixture sufficient time to become clear.

Lacquer for Brass.

Shellac	1 oz.
Seedlac	1 oz.
Venetian turpentine . .	½ oz.
Alcohol	20 oz.

Elastic Dammar Lacquer.

No. 1.—Dammar	1·4 oz.
Acetone	6·3 oz.

Dissolve by standing the ingredients in a closed bottle in a moderately warm place for 14 days, and, pouring off the dissolved portion from the residuum, apply with a soft brush, and give several coats.

No. 2.—Amber	1 oz.
Copal	1 oz.
Mastic	½ oz.
Petroleum naphtha . .	5 oz.
Spirits of wine . . .	10 oz.

Dissolve as above in No. 1.

Simple Lacquer for Leather.

Equal parts of caoutchouc varnish and volatile copal varnish.

Lacquers for Floors.

No. 1.	Colophony	10 parts
	Ruby shellac	20 parts
	Venetian turpentine	5 parts
	Spirits of wine	100 parts

Dissolve by standing for a time in the spirits of wine.

No. 2.	Colophony	15 parts
	Ruby shellac	10 parts
	Oil of turpentine	5 parts
	Spirits of wine	60 parts

Dissolve.

No. 3.	Shellac	5¼ oz.
	Alcohol	17 gills

This lacquer is for use on floors which have been painted any colour, as the thin coating of lacquer will make the colour more durable than would be the case without it.

Bernarth's Formula for ditto.

Shellac	17½ oz.
White colophony	8¾ oz.
Camphor	·07 oz.
Alcohol 96 per cent.	6·6 lb.

Powder the lac, colophony and camphor; dissolve in the spirit by warmth and frequent shakings, then filter through a cloth. This lacquer should be warmed when it is used. 17½ oz. cover a floor surface of 36 square feet.

Lacquer for Dark Wall Paper.

Borax	1 oz.
Stick or shellac	1 oz.
Hot water	10 oz.

Dissolve the borax and shellac in the water, strain through a cloth, and apply the lacquer to the paper, either before or after it is put on the wall. When dry, brush the paper over with a soft brush, which will give it a fine lustre. Two coats should be given in the usual manner with a brush, the first coat being thoroughly dry before the second is put on.

Black Lacquer for Wood.

Elemi	1 oz.
Seedlac	1 oz.
Mastic	1 oz.
Sandarac	1 oz.
Shellac	2 oz.
Venetian turpentine	1 oz.
Alcohol	20 oz.
Bone black	1 oz.

Rub up the bone black in the turpentine, and add them to the solution formed by dissolving the resins in the spirit.

Lacquer for Comb Makers.

Elemi	1 oz.
Mastic	1 oz.
Shellac	5 oz.
Alcohol	20 oz.

Dissolve in the alcohol.

Lacquer for Tinsmiths.

Elemi	1 oz.
Seedlac	5 oz.
Sandarac	2½ oz.
Bleached shellac	2½ oz.
Alcohol	4 oz.

Dissolve in the alcohol.

Lacquer for Copper Plates.

Camphor	1 oz.
Mastic	1 oz.
Sandarac	2½ oz.
Bleached shellac	2½ oz.
Alcohol	40 oz.

Bookbinders' White Lacquer.

Bleached shellac	4⅕ oz.
Alcohol 92 per cent.	0·6 oz.

Dissolve, filter and evaporate to a quarter of its bulk by distillation, then add 1 oz. of oil of lavender.

Paris Brown Bookbinders' Lacquer.

Shellac	8¾ oz.
Oil of lavender	·525 oz.
Gamboge	1·05 oz.
Alcohol 98 per cent.	2¾ lb.

Prepare this lacquer precisely as the last, and then add 1·4 oz. bookbinders' brown lacquer of the same quality. Finally, filter from the sediment.

Bookbinders' Lacquer.

No. 1.—Shellac	10 parts
Oil of turpentine	1 part
Spirits of wine	30 parts

Digest in the spirits.

No. 2.—Dragon's blood	1 part
Gum size	10 parts
Sandarac	2 parts
Shellac	20 parts
Venetian turpentine	5 parts
Spirits of wine	100 parts

Digest in the spirits.

Bookbinders' Ordinary Brown Lacquer.

Brown shellac	4½ oz.
Alcohol 84 per cent.	3⅝ lb.

Dissolve the shellac, filter, and then distil off or evaporate half the alcohol, and add ¼ oz. of oil of lavender to the remaining fluids.

High Coloured Lacquer.

Spirits of wine	2 qrt.
Shellac	2½ oz.
Sandarac	2 oz.
Elemi	½ oz.
Wood alcohol	1 qrt.

Mix, and keep gently warmed for two or three days; strain, colour with dragon's blood to tone.

Green Lacquer.

Turmeric	18 oz.
Shellac	15 oz.
Sandarac	1 oz.
Elemi	3 oz.
Gamboge	3 oz.
Methylated spirit	4½ gall.

Digest all the ingredients in two-thirds of the spirit, then strain, and to the sediment add the remainder of the spirit, and strain; then mix the two portions of strained fluid.

Lacquer for Wall-paper.

Borax and shellac equal parts, ten times their weight of alcohol; digest, strain, and give two coats. For a very light-coloured paper use sandarac instead of shellac. Paper treated with this lacquer can be washed with water, and even with soap if necessary.

Lacquer for Copper.

Mastic	8 parts
Camphor	6 parts
Sandarac	15 parts
Bleached shellac	15 parts
Alcohol	40 parts

A Universal Lacquer,

which is equally good for paper, metal, wood, glass, etc., and which admits of being coloured with any aniline dye soluble in alcohol, is prepared as follows :—

Bleached shellac . . .	60 grn.
Freshly powdered Manila copal	60 grn.
Mastic	60 grn.
Boracic acid	1 grn.
Alcohol 92 to 95 per cent. over-proof	2¼ lb.

Mix all the ingredients but the boracic acid with the alcohol, and let it digest from eight to fourteen days, frequently shaking ; then add the boracic acid, and filter.

Lacquer for Copper-plates.

Mastic	6 parts
Camphor	6 parts
Bleached sandarac . . .	15 parts
Bleached shellac . . .	15 parts
Strong alcohol . . .	200 to 280 parts

Turner's Lacquer.

Elemi	4 parts
Bleached shellac . . .	20 parts
Venetian turpentine . .	4 parts
Alcohol	60 parts

Digest the solids in the spirit.

Colour for Lacquer for Brass.

Alcohol	1 pint
Annatto	2 oz.

Digest.

Lacquer for Tools.

Seed or shellac dissolved in spirits of wine.

Clean and polish the tools so as to be free from grease, then slightly warm and varnish with the lac varnish ; the success of the operation depends on

the cleanness of the surface. A finger touch before varnishing will affect the finish.

Spirit Lacquer for Lacquering Wax Tapers.

Mastic	4 parts
Sandarac	40 parts
Alcohol 96 per cent.	96 parts

Lacquer for Drawings.

Gum dammar	3 to 4 parts
Acetone	18 parts
Thickly fluid collodion	3 parts

Dissolve the gum in the spirit, then mix 4 parts of the solution with 3 parts of collodion.

French Leather Lacquer.

Logwood shavings	15 parts
Water	120 parts
Sugar	2 parts
Gum-arabic	12 parts
Ferric sulphate solution	q.s.
Alcohol	q.s.

Boil the logwood in the water until it is reduced to one-half, then dissolve sugar and gum in the solution, and add the solution of ferric sulphate until the primarily brown-red colour of the decoction has changed into a rich blue tint, then add the spirits of wine.

Black Harness Lacquer.

Best shellac	40 parts
Laudanum	10 parts
Mastic	5 parts
Spirits of wine	500 parts
Pure Venetian turpentine	20 to 30 parts
Aniline black (nigrosine).*	1 part

* Dissolved in water or alcohol.

Dissolve the resins in the spirits, and, to prevent the lacquer becoming brittle, add the solution of

Venetian turpentine and sufficient nigrosine to give the mixture an intense black colour.

Ordinary Body Carriage Lacquer.

Best African copal	2 parts
Clarified linseed oil	7 parts
Turpentine	8 parts
Best gum anime	2 parts
Clarified linseed oil	5 parts
Turpentine	7 parts

Two kinds of varnish have to be separately made, and when dry are mixed thus: boil the first three ingredients together for four hours, mix thoroughly by stirring, and then strain. Secondly, boil the anime, 5 parts of oil and 7 of turpentine for a similar period; strain while it is hot, and put it into the pot used for preparing the copal varnish. Mix 2 parts of the anime varnish with 1 of the copal varnish. This mixture will dry quicker and harder than the best boiling copal varnish, and will polish very soon.

Cheap Lacquer for Harnesses and Carriage Tops.

Glue	2 parts
Ordinary soap	3 parts
Water	q.s.
Spirit varnish	3 to 4 parts
Good wheat starch	2 parts

Soak the glue in water and then liquefy it over a moderate fire. Also dissolve the soap in water separately, and then mix the two solutions; about 120 parts of water will be necessary for dissolving both ingredients. After the two solutions have been intimately mixed, add the spirit varnish, and finally stir in the starch, which should have been previously stirred into a paste with some water. Now place the pot containing the mixture over a moderate coal fire, and let it evaporate, although it

may also be used before evaporation; the evaporated mass when to be used is liquefied by adding beer or water. The thinner the coat the more beautiful will be the gloss.

Elastic Lacquer.

Lime	15 parts
Water	20 parts
Melted crude caoutchouc	50 parts

Slake the lime in the water, and add the crude caoutchouc while the lime is yet warm. When cold the lacquer is in the form of a paste. It is best applied warm.

Transparent Lacquer for Closing Bottles.

Resin	2 parts
Ether	4 parts
Collodion	6 parts

And any desired colouring matter.

SPECIAL WOOD STAINS AND IMITATIONS.

Imitation Ebony.

Strong vinegar	½ gall.
Extract of logwood	1 lb.
Copperas	¼ lb.
China blue	2 oz.
Nut-gall	1 oz.

Put these into an iron pot, and boil them over a slow fire till they are well dissolved. When cool, the mixture is ready for use. Add a gill of iron filings steeped in vinegar. The above makes a perfect jet black, equal to the best black ebony. A very good black is obtained by a solution of sulphate of copper and nitric acid; when dry, the work should have a coat of strong logwood stain.

Imitation Oak.

To imitate old oak, the process known as "fumigating" is the best. This is produced by 2 oz. of American potash and 2 oz. of pearlash mixed together in a vessel containing 1 qrt. of hot water, and brush over the surface.

Another method is by dissolving a lump of bichromate of potash in warm water; the tint can be varied by adding more water. This is best done out of doors in a good light. Very often in sending for bichromate of potash a mistake is made, and chromate of potash is procured instead; this is of a yellow colour, and will not answer the purpose. The bichromate of potash is the most powerful, and is of a red colour.

Imitation Walnut.

A mixture of 2 parts of brown umber and 1 part of sulphuric acid, with spirits of wine or methylated spirits added until it is sufficiently fluid, will serve for white wood. Showy elm wood, after being delicately darkened with the above bichromate solution, will pass for walnut; it is usually applied on the cheap loo-table pillars, which are made of elm wood. Equal portions of the bichromate and carbonate solutions used upon American pine, will have a very good effect.

The bichromate of potash is useful to darken oak, walnut, beech or mahogany, but if applied to ash it renders it of a greenish cast. If a sappy piece of walnut should be used either in the solid or veneer, darken it to match the ground colour, and then fill in the dark markings with a feather and the black stain. The carbonate solutions are generally used for dark surfaces, such as rosewood represents, and a still darker shade can be given to any one by oiling over after the stain is dry.

Imitation Mahogany.

½ lb. of madder root and 2 oz. of logwood chips boiled in 1 gall. of water. Brush over while hot; when dry, go over it with a solution of pearlash, 1 drm. to a pint. Beech or birch, brush with aquafortis in sweeping regular strokes, and immediately dried in front of a good fire, form very good imitations of old wood. Venetian red mixed with raw linseed oil also forms a good stain.

The following is a method in common use by French cabinet-makers. The white wood is first brushed over with a diluted solution of nitrous acid; next, with a solution made of methylated spirits 1 gill, carbonate of soda ¾ oz., and dragon's blood ¼ oz.; and a little red tint is added to the varnish or polish used afterwards. Black American walnut can be made to imitate mahogany by brushing it over with a weak solution of nitric acid.

Imitation Rosewood.

Boil ½ lb. of logwood chips in 3 pints of water until the decoction is a very dark red; then add 1 oz. salts of tartar. Give the work three coats boiling hot; then with a graining tool or a feather paint in the dark markings with a black stain. A stain of a very bright shade can be made with methylated spirits ½ gall., camwood ¾ lb., red-sanders ¼ lb., extract of logwood ½ lb., aquafortis 1 oz. When dissolved, it is ready for use. This makes a very bright ground. It should be applied in three coats over the whole surface, and when dry it is glass-papered down with fine paper to a smooth surface, and is then ready for graining.

Imitation Purple-wood Stain.

Grind a piece of green copperas on coarse glass-paper, and mix with a polish coloured with red-sanders. This makes a capital purple stain, and is used by French cabinet-makers.

These dyestuffs may be much improved by the addition of a mordant applied after they are dry; this will greatly assist in modifying and fixing the tints and shades which the dyes impart. The best thing for the purpose, in the writer's opinion, is clear ox-gall, which, besides being useful as a mordant, will destroy all unctuous matter.

A Red Stain.

Methylated Spirits	1 qrt.
Brazil-wood	3 oz.
Dragon's blood	½ oz.
Cochineal	½ oz.
Saffron	1 oz.

Steep the whole to its full strength, and strain.

A red can also be produced by macerating red-sanders in rectified spirits of naphtha. An orange-red colour may be obtained by the successive action of bichloride of mercury and iodide of potash, madder, and ammoniacal solutions of carmine.

To Stain Plaster of Paris Casts, or to Colour them.

1. Mix various coloured powders or solutions with the plaster, at the time of mixing it up with water. A little terra de Sienna, in very fine powder, if ground with water, and added to the water employed to mix up the plaster, imparts a pleasing colour to busts, statues, medallions, etc.

2. Objects formed from the solid alabaster may be stained in the same way and with the same materials as marble.

To Stain Bricks.

1. For staining bricks red, melt 1 oz. of glue in 1 gall. of water; add a piece of alum the size of an egg, then ½ lb. Venetian red and 1 lb. of Spanish brown. Try the colour on the bricks before using, and change light or dark with the red or brown, using a yellow mineral for buff.

2. For colouring black, heat asphaltum to a fluid state, and moderately heat the surface of the bricks and dip them.

3. Or make a hot mixture of linseed oil and asphalt; heat the bricks and dip them. Tar and asphalt are also used for the same purpose. It is important that the bricks be sufficiently hot, and be held in the mixture to absorb the colour to the depth of $\frac{1}{16}$ of an inch.

Horn, to Stain.

After having fine sand-papered the horns, dissolve 50 to 60 gr. nitrate of silver in 1 oz. distilled water. It will be colourless. Dip a small brush in, and paint the horns where they are to be black. When dry, put them where the sun can shine on them, and you will find that they will turn jet black. When done, polish off.

By boiling well in infusions of various coloured ingredients, they can be made to imitate tortoise-shell. Mix together pearlash, quick-lime and litharge with a sufficient quantity of water and a little pounded dragon's blood, and boil them together for half an hour; apply this hot. For black, use iron filings, and copperas, applied with vinegar.

Black.—Quicklime, 5 lb. 5 oz., are slaked in a little water, so that a powder-like hydrate of lime is obtained; this is mixed with 2 lb. 2 oz. minium, and this mixture is formed into a thick paste with caustic soda lye, such as soap-boilers use. The articles of horn must be placed in this solution for 24 hours; they are then taken out, rinsed off with water, dried with a cloth, brushed over with rape-seed oil, and then again rubbed dry.

Or for *Black.*—Dissolve 14 grns. silver in 2 oz. nitric acid (aquafortis), and apply this solution several times to the horns to be stained, but it is

absolutely necessary that the first coat should be entirely dry before another is applied. The articles are then burnished and made bright.

Blue.—Stain green, and then steep for a short time in a weak solution of sulphate of indigo, containing a little cream of tartar.

Brown.—Immerse in aqueous solution of potassium ferrocyanide, dry, and treat with a hot dilute solution of copper sulphate.

Green.—Dissolve ½ oz. fine indigo carmine in 2 oz. rain water. Then 175 gr. pure picric acid, and dissolve in 2 oz. boiling hot rain water, and mix both solutions together. A very beautiful durable green colour will in this manner be obtained, and can be used for various purposes.

Or *Aniline Green*, 35 gr. Dissolve in 4 oz. of spirits of wine 90 per cent. overproof, and the horn to be stained is treated with this solution. All the different shades of green may be produced by adding blue or yellow colouring to this.

Or Copper, 4 oz. Cut up finely and gradually dissolve in 13 oz. nitric acid (aquafortis), and the articles boiled in this solution until they have assumed a fine green colour.

Or steep in a solution of 2 parts of verdigris and 1 part of sal-ammoniac.

Purple.—Logwood, 17 oz. Boil in 4¼ lb. milk of lime, and follow the formula given for red staining.

Or use a strong aqueous solution of gold chloride.

Red.—Red Brazil wood, 17 oz., are boiled for one hour in 4¼ lb. milk of lime, then filtered through a cloth. The articles of horn, ivory or bone to be stained are to be first boiled for one hour in a solution of 1 oz. alum in 17 oz. water. They are

then placed in the above stain, and allowed to remain there until the desired colour has been produced. A purple colour can be obtained by dipping afterwards in alum water.

Another plan is to soak the articles in very dilute nitric acid for a few minutes, and then apply a strong infusion of cochineal in aqua ammonia.

For *Bright Red.*—Logwood, 8¾ oz., and 8¾ oz. red Brazil wood are boiled in 4¼ lb. milk of lime.

Yellow.—Alum, 17 oz., free from iron, are dissolved in 4¼ lb. rain water. The articles are allowed to lie in this for one or two hours. In the meanwhile 7 oz. yellow berries are boiled with 4½ oz. carbonate of potash in 2½ lb. water for one hour, and then strained. The articles saturated with alum are placed in this decoction and allowed to lie in it for one hour. Then take out and dry.

Or steep them in a solution of lead acetate, and then, after drying, in a solution of bichromate of potash.

To Stain Ivory.

Black.—Boil for a short time in a strained solution of logwood; afterward immerse in a solution of iron sulphate.

Blue.—Immerse for a short time in a dilute solution of indigo carmine.

Yellow.—Immerse for about fifteen minutes in a solution of potassium chromate.

Red.—Macerate cochineal in vinegar, and boil in the liquid for a few minutes.

Violet.—Dye red first, then immerse for an instant in solution of indigo carmine.

Green.—Dye yellow first, and afterward dip into solution of indigo carmine.

To Stain Ivory Black.—The pieces are always first polished with whiting and water, and when washed quite clean from the whiting, are prepared for the stain by a short immersion of from three to five minutes in a cold bath of one part of muriatic acid acidulated by mixing 1 oz. of spirits of salt in 50 oz. of water, or in an equally weak solution of nitric acid. This cleansing fluid extracts the gelatine from the surface of the ivory, and is essential to the attainment of a perfectly uniform colour. Extreme cleanliness, and the absence of any grease, are necessary, and the work in process of staining is at no time to be touched by the fingers, but should be removed from one vessel to another by a pair of hard-wood pincers, separate pairs being kept for different colours. Subsequently to its treatment with the acid, the ivory must be again placed in cold water that has been boiled before the stained article is transferred to it. Have ready a decoction of 2 oz. of logwood dust boiled in 1 qrt. of water, and strain; dissolve 1 oz. of sulphate of iron in 1 qrt. of water; then heat the two stains in separate vessels to 100° F., and immerse the ivory in the logwood stain for 15 minutes. Wash free from the logwood liquor, and afterwards place it for five minutes in the sulphate of iron stain.

Leather, to Stain.

To stain a sole leather bag which has become faded a dark mahogany colour:

Alkanet root	15 grn.
Aloes	30 grn.
Dragon's blood (all in powder)	30 grn.
Alcohol 95 per cent. . .	500 grn.

Moisten the bag with dilute nitric acid (1 part acid to 50 parts water by volume) and then apply above solution. Repeat until dark enough.

Marble, Blue Stain for.

Tincture or solution of litmus, or an alkaline solution of indigo. Heat the marble so that the liquid will just simmer on the surface.

Pottery, Stains for.

In preparing these stains the ingredients must be ground remarkably fine, and then so perfectly dried as not to leave the least humidity, after which they must be ground again with oil prepared for the purpose, composed of two parts of balsam of sulphur, 1 part of amber oil, and as much turpentine as will render them of a proper consistency; they may then be used with ease for painting various devices on biscuit ware.

Blue Stain.—Five parts blue calx, 2 parts frit for glazes, without oxide of tin, 1 part flint glass, 1 part enamel blue.

Yellow Stain.—Three parts yellow under-glaze, 1 part frit for glazes, ¼ part chromate of iron.

Green Stain.—Three parts blue stain, 1 part yellow stain, ½ part enamel blue green.

Wood Staining.

The best woods for staining are those of close, even texture—as cherry, beech, birch and maple. The wood should be perfectly dry, and planed and sandpapered very smooth. Nearly all of the stains should be applied hot, as this causes them to penetrate the pores more deeply. If the wood is to be varnished, many of the dyes used in cloth dyeing may be used in alcoholic solutions, but the effect is not equal to the regular stain. In case the natural colour of the wood prevents it being stained satisfactorily, bleach it by washing with the following solution:—

Chloride of lime . . .	9 oz.
Water	2½ qrt.

but only use the clear liquor after allowing the lime to settle to the bottom of the vessel used to prepare the bleaching fluid.

The wood may be bleached in this for half an hour. Wash with a very weak solution of sulphurous acid, and afterwards with one of hyposulphite of soda liquor.

Wood, to Stain.

Black.—Obtained by boiling together blue Brazil wood, powdered gall-apples and alum in rain or river water until it becomes black. This liquid is then filtered through a fine canvas, and the objects painted with a new brush before the decoction has cooled, and this repeated until the wood appears of a fine black colour.

Then wash over with the following preparations:—

One ounce nut-gall broken into small pieces, put into barely half a pint of vinegar, which must be contained in an open vessel; let it stand for about half an hour; add 1 oz. steel filings; the vinegar will then commence effervescing; cover up, but not sufficient to exclude air. The solution must then stand for about 2½ hours, when it will be ready for use. Apply the solution with a brush or piece of rag to the article, then let it remain until dry; if not black enough, coat it until it is—each time, of course, letting it remain sufficiently long to dry thoroughly. After the solution is made, keep it in a closely corked bottle.

Or one gallon water, 1 lb. logwood chips, ½ lb. black copperas, ½ lb. extract of logwood, ½ lb. indigo blue, 2 oz. lampblack. Put these into an iron pot and boil them over a slow fire. When the mixture is cool, strain it through a cloth, add ¼ oz. nut-gall. It is then ready for use. This is a good black for all kinds of cheap work.

Or campeachy wood, 250 parts; water, 2000 parts; and copper sulphate, 30 parts. The wood is allowed to stand 24 hours in this liquor, dried in the air, and finally immersed in iron nitrate liquor at 4° Beaumé hydrometer.

Or boil 8¾ oz. logwood in 70 oz. water and 1 oz. bluestone, and steep the wood for 24 hours. Take out, expose to the air for a long time, and then steep for 12 hours in a beck of iron nitrate at 4° Beaumé hydrometer. If the black is not fine, steep again in logwood liquor.

It is customary to employ the clear liquid obtained by treating 2 parts powdered galls with 15 parts wine, and mixing the filtered liquid with a solution of iron protosulphate. Reimann recommends the use of water in the place of wine.

Or almost any wood can be dyed black by the following means: Take logwood extract such as is found in commerce, powder 1 oz., and boil it in 3¼ pints water; when the extract is dissolved, add 1 drm. potash yellow chromate (not the bichromate), and agitate the whole. The operation is now finished, and the liquid will serve equally well to write with or to stain wood. Its colour is a very fine dark purple, which becomes a pure black when applied to the wood.

A Varnish for Carved and Stained Woods.

For black and gold furniture, procure 1 lb. logwood chips, add 2 qrt. water, boil one hour; brush the liquor in hot; when dry give another coat. Now procure 1 oz. green copperas, dissolve it in warm water, well mix, and brush the solution over the wood; it will bring out a fine black; but the wood should be dried out of doors, as the black sets better. A common stove brush is best. If polish cannot be used, proceed as follows: Fill up

the grain with black glue—i.e. thin glue and lamp-black—brushed over the parts accessible (not in the carvings); when dry, smooth down with fine paper. Now procure, say, a gill of French polish, in which mix 1 oz. best ivory black, or gas black is best; shake it well until quite a thick pasty mass; procure ½ pint brown hard varnish, pour a portion into a cup, add enough black polish to make it quite dark, then varnish the work; two thin coats are better than one thick coat. The first coat may be glass-papered down where accessible, as it will look better. A coat of glaze over the whole gives a London finish.

To Clear off Old Varnish from Wood previous to Renovation.

Wash the surface with liquid ammonia, applied with a piece of rag; the varnish will then peel off like a skin; afterwards smooth down with fine sandpaper. Then mix ¼ lb. lampblack with 1 qrt. hot water, adding a little glue size; rub this stain well in; let it dry before sand-papering it; smooth again. Mind you do not work through the stain. Afterwards apply the following black varnish with a broad fine camel hair brush: Mix a small quantity of lampblack with the varnish you apply, and if one coat of varnish is not sufficient, apply a second one after the first is dry.

A Violet Wood Stain.

Boil 17 oz. Brazil wood and ¾ oz. alum for one hour in 2¾ lb. water. The coloured liquor is then filtered from the boiled Brazil wood, and applied several times boiling hot to the wood to be stained. This will assume a violet colour. This violet colour can be easily changed into black by preparing a solution of 2 oz. iron filings and 1 oz. common salt in 17 oz. vinegar. The solution is filtered and applied

to the wood, which will then acquire a beautiful black colour.

Or boil 8¾ oz. gall-nuts and 2 lb. logwood in 2 lb. rain water for one hour in a copper boiler. The decoction is then filtered through a cloth and applied several times while it is still warm to the article of wood to be stained. In this manner a beautiful black will be obtained.

Or several coats of alizarine ink may be applied to the wood as a dye, but every coat must be thoroughly dry before the other is put on. This is to be followed by the solution of iron filings, common salt and vinegar, as given above, when a very durable black will be obtained.

Hertzog's Ebony Stain.

A black stain, giving a colour resembling ebony, is obtained by treating wood with two fluids, one after the other. The first fluid to be used consists of a very concentrated solution of logwood, and to ⅓ oz. of this fluid are added 17 grns. of alum. The other fluid is obtained by digesting iron filings in vinegar. After the wood has been dipped in the first fluid hot, it is allowed to dry, and is then treated with the second fluid, several times if necessary.

Another Black.

Sponge the wood with a solution of aniline chlorhydrate in water, to which a small quantity of copper chloride is added. Allow it to dry, and go over it with a solution of potassium bichromate. Repeat the process two or three times, and the wood will take a fine black colour.

Another.

Put iron filings, or the spark scales from a smith's forge, in a bottle, so as to fill it, say, a quarter full. Fill up with strong vinegar. Shake this up a couple of times a day for three or four

days. Now boil some ground logwood in water, so as to make a strong decoction, which apply to the wood at a boiling heat, and afterwards wash over with the iron and vinegar liquor.

Blue Stain.

A beautiful blue stain is obtained by gradually stirring ½ oz. finely powdered indigo into 4⅛ oz. sulphuric acid of 60 per cent. strength Twaddle's hydrometer, and by exposing this mixture for twelve hours to a temperature of 77° F. (25° C.). The result is to be then diluted with 11 to 13 lb. of rain water, and filtered through felt. Apply the wash thus prepared several times to the wood, until the desired colour has been obtained.

Another Blue Stain.

Take 1 oz. finest indigo carmine, dissolved in 8¾ oz. of water, applied several times to the articles to be stained. A very fine blue is in this manner obtained.

Or prepare as for violet, and dye with aniline blue.

Or brush it over with a strong, hot solution of nitrate of copper dissolved in water, and then wash over the work with a hot solution of carbonate of soda, using 2 oz. to 1 pint water.

Another Blue.

Boil 1 lb. indigo, 2 lb. woad, and 3 oz. alum in 1 gall. water, and apply with a brush.

Brown Stains.

Various tones may be produced by mordanting with potash chromate, and applying a decoction of fustic, of logwood, or of peachwood.

Or sulphuric acid, more or less diluted, according to the intensity of the colour to be produced, is applied with a brush to the wood, previously cleaned and dried. A lighter or darker brown stain is ob-

tained, according to the strength of the acid. When the acid has acted sufficiently, its further action is arrested by the application of ammonia and water in a strong solution.

Or tincture of iodine yields a fine brown coloration, which, however, is not permanent unless the air is excluded by a thick coating of polish.

Or a simple brown wash is ½ oz. alkanet root, 1 oz. aloes, 1 oz. dragon's blood, digested in 1 lb. alcohol. This is applied after the wood has been washed with aqua regia, but is, like all the alcoholic washes, not very durable.

Stotzel's Brown Stain.

Dr. Stotzel gives a recipe for staining wood of a brown colour. He first of all paints over the wood with a solution made by boiling 1 part catechu (cutch or gambier) with 30 parts water and a little soda. This washing is allowed to dry in the open air, and then the wood is painted over with another solution made of 1 oz. bichromate of potash and dissolved in 30 oz. water.

Cherry Stain.

For cherry stain, take of rain water, 3 qrt.; annatto, 4 oz.; boil in a copper kettle till the annatto is dissolved, then add 1 oz. of potash and boil for half an hour longer, when it will be ready to bottle for use.

A Rosewood Stain.

For rosewood stain, take alcohol, 1 gall.; camwood, 2 oz.; set them in a warm place twenty-four hours; then add extract of logwood, 3 oz.; aquafortis, 1 oz.; and when dissolved, it is ready for use.

Red Stain for Bedsteads and Common Chairs.

Archil will produce a very good stain of itself when used cold; but if, after one or two coats being

applied and suffered to become almost dry, it is brushed over with a hot solution of pearlash in water, the colour will be improved.

To Give an Appearance of Age to Furniture.

Boil ½ lb. madder and 2 oz. logwood chips in 1 gall. of water, and brush the wood with it when at a boiling heat; when dry, go over the whole with pearlash solution of 2 drm. to the qrt.

Or boil ½ lb. logwood in 3 pints of water, and add ½ oz. salts of tartar. Stain the wood with the boiling hot liquor.

Or boil ½ lb. madder and ¼ lb. fustic in 1 gall. water; use hot as before.

Or boil 1 lb. Brazil wood and 1 oz. of washing soda in 1 gall. of water; apply hot, and then brush over it, before dry, a solution of 2 oz. alum in 1 qrt. of water.

A Varnish for the Above.

Take of 95 per cent. overproof alcohol, ½ gall.; add 6 oz. gum sandarac, 3 oz. gum mastic, and ½ pint turpentine varnish; put the above in a tin can beside the stove, frequently shaking till well dissolved; strain, and keep for use. If you find it harder than you wish, thin it by adding more turpentine varnish.

EBONISING.

First, boil 1 lb. logwood chips one hour in 2 qrt. water; brush the hot liquor over the work to be stained, and lay aside to dry; when dry give another coat, still using it hot. When the second coat is dry, brush a liquor over the work made as follows: 1 oz. green copperas to 1 qrt. hot water. It will bring out an intense black when dry.

General Instructions for Wood-staining Work.

The work must not be dried by fire, but in the sunshine, if possible; if not, in a warm room, away from the fire. To polish this work, first give a coating of very thin glue size, and when quite dry, smooth off very lightly with No. 0 paper, only just enough to render smooth, but not to remove the black stain. Then make a rubber of wadding about the size of a walnut, moisten the rubber with French polish, cover the whole tightly with a double linen rag, put one drop of oil on the surface, and rub the work with a circular motion. Should the rubber stick, it requires more polish. Previous to putting the French polish on the wadding pledget, it ought to be mixed with the best drop black, in the proportion of $\frac{1}{4}$ oz. drop black to a gill of French polish. When the work has received one coat, set it aside to dry for about an hour. After the first coat is laid on and thoroughly dry, it should be partly papered off with No. 0 paper. This brings the surface even, and at the same time fills up the grain. Now give a second coat as before. Allow twenty-four hours to elapse, again smooth off, and give a final coat as before. Now comes spiriting off. Great care must be used here, or the work will be dull instead of bright. A clean rubber must be made, as previously described, but instead of being moistened with polish, it must be wetted with 90 per cent. alcohol, applied by a linen rag screwed into a tight, even surfaced ball, and just touched on the face with a drop of oil, and then rubbed lightly and quickly with circular sweeps all over the work from top to bottom. One application of spirits is usually enough if sufficient has been placed on the rubber at the outset, but it is better to use rather too little than too much at a time, as an excess will entirely remove the polish, when the work will have to be

polished again. Should this be the case, paper off at once, and commence as at first. It is the best way in the end.

Ebony Stain.

One gall. strong vinegar, 2 lb. extract logwood, ½ lb. green copperas, ¼ lb. China blue, and 2 oz. nut-gall. Put these in an iron pot, and boil them over a slow fire till they are well dissolved. When cool, the mixture is ready for use. Add to the above ½ pint of oxide of iron, which may be obtained by scraping rusty hoops, or preferably by steeping iron filings in a solution of acetic acid or strong vinegar.

Another Ebony.

Common ebony stain is obtained by preparing two baths ; the first, applied warm, consists of a logwood decoction, to every qrt. of which 1 drm. alum is added ; the second is a solution of iron filings in vinegar. After the wood has dried from the first, the second is applied as often as is required. For the first named bath, some substitute 16 oz. gall-nut, 4 oz. logwood dust, and 2 oz. verdigris, boiled in a sufficient quantity of water. A peculiar method of blackening walnut is in use at Nurnberg. On one of the Pegnitz Islands there is a large grinding mill, turned by the stream, where iron tools are sharpened and polished. The wood is buried for a week or more in the slime formed by the wheels ; when dug out it is jet black, and so permeated by silica as to be in effect petrified. Another way to ebonise flat surfaces of soft work is to rub very fine charcoal dust into the pores with oil. This works beautifully with the European linden and American whitewood. A brown mahogany-like stain is best used on elm and walnut. Take a pint decoction of 2 oz. logwood in which ½ oz. barium chloride has been dissolved. This gives also, when diluted with

soft water, a good oak stain to ash and chestnut. But the most beautiful and lasting of the browns is a concentrated solution of potash permanganate (mineral chameleon). This is decomposed by the woody fibre, and forms hydrated manganese oxide, which is permanently fixed by the alkali.

Another Ebony.

Wash with a concentrated aqueous solution of logwood extract several times; then with a solution of iron acetate of 14° Beaumé hydrometer, which is repeated until a deep black is produced.

Wood Furniture Stains.

Black Stain for Wood.—There are two kinds—the ordinary black stain for different kinds of wood and the black ebony stain for certain woods which approach nearer to ebony in hardness and weight. The ordinary black wood stain is obtained by boiling together blue Brazil wood, powdered gall-apples and alum in soft water until it becomes black. This liquid is then filtered, and the objects painted with a new brush before the decoction has cooled, and this repeated until the wood appears of a fine black colour; it is then coated with the following liquid: A mixture of iron filings, vitriol and vinegar is heated (without boiling), and left a few days to settle. If the wood is black enough, yet for the sake of durability it must be further coated with a solution of alum and nitric acid, mixed with a little verdigris, then a decoction of gall-apples and logwood dyes is used to give it a deeper black. Soft pearwood is preferable to all others for black staining. For the fine black ebony stain, apple, pear and hazel wood are the best woods to use; when stained black, they are most complete imitations of the natural ebony.

For the stain take gall-apple, 14 oz.; rasped logwood, $3\frac{1}{2}$ oz.; vitriol, $1\frac{3}{4}$ oz.; verdigris, $1\frac{3}{4}$ oz. For

the second coating a mixture of iron filings (pure), $3\frac{1}{2}$ oz., dissolved in strong wine vinegar; $\frac{3}{4}$ litre ($1\frac{1}{2}$ pint nearly) is warmed, and when cool the wood already blackened is coated 2 or 3 times with it, allowing it to dry between each coat. For articles which are to be thoroughly saturated a mixture of $1\frac{3}{4}$ oz. sal-ammoniac, with a sufficient quantity of steel filings, is to be placed in a suitable vessel, strong vinegar poured upon it, and left for 14 days in a gently heated oven. A strong lye is now put into a suitable pot, to which are added coarsely bruised gall-apples and blue Brazil shavings, and exposed for the same time as the former to the gentle heat of an oven, which will then yield a good liquid. The woods are now laid in the first named stain, boiled for a few hours and left in it for 3 days longer; they are then placed in the second stain and treated as in the first. If the articles are not then thoroughly saturated, they may be once more placed in the first bath and then in the second. The polish used for wood that is stained black should be white (colourless) polish, to which a very little finely ground Prussian blue should be added.

Beech, pear tree, or holly may be steeped in a strong liquor of logwood or galls. Let the wood dry, and wash over with solution of iron sulphate. Wash with clean water, and repeat if colour is not dark enough. Polish either with black or common French polish.

Oak Staining.

Oak is immersed for 48 hours in a hot saturated solution of alum, and then brushed over several times with a logwood decoction prepared as follows: Boil 1 lb. best logwood with 10 of water, filter through linen, and evaporate at a gentle heat until the volume is reduced one-half. To every qrt. of this add 10 to 15 drops of a saturated solution of

indigo, completely neutral. After applying this dye to the wood, rub the latter with a saturated and filtered solution of verdigris in hot concentrated acetic acid, and repeat the operation until a black of the desired intensity is obtained. Oak thus stained is said to be a close as well as handsome imitation of ebony.

Or 1 lb. logwood chips, 3 pints water; boil to 1 pint; apply hot to wood; let dry; then give another coat; let dry slowly; sandpaper smooth; mix 1 gill vinegar with 3 tablespoonfuls iron or steel filings; let stand five hours, then brush on wood; let dry; then give another coat of the first. This sends the vinegar deeper into the wood and makes a denser black; after which paper smooth. Then polish with white French polish, as the white brings out the black purer than common French polish. The woods observed to take on the stain best are pear tree, plane tree and straight reeded birch; mahogany does not stain nearly so well as the former woods.

Or get 1 lb. of logwood chips and boil them down in enough water to make a good dark colour; give the furniture three or four coats with a sponge; then put some rusty nails or old iron into a bottle with some vinegar, and when it begins to work give the furniture a coat of the vinegar. This, if you have well darkened it with the first, will give you a good black. Oil and polish in the usual way, rubbing down first with fine paper if required. A quicker way is to give the wood a coat of size and lamp-black, and then use gas black in your polish rubber.

Or make a strong decoction of logwood by boiling 1 lb. in 1 qrt. of water for 1 hour; add thereto a piece of washing soda as large as a hazel nut. Apply hot to the wood with a soft brush. Allow to dry, then paint over the wood with a solution of iron sulphate (1 oz. to the pint of water). Allow this to dry, and repeat the logwood and iron

sulphate for at least three times, finishing off with logwood. Once more allow to dry thoroughly; then sandpaper off very lightly (so as not to remove the dye) with No. 0 paper. Now make a very thin glue size, boil in a few chips of logwood and a crystal or two of iron sulphate, just sufficient to make it inky black. Paint this lightly over the work, allow to dry once more, again sandpaper lightly, and finally either varnish with good hard white varnish or polish with French polish and drop black.

Take 1 gall. of strong vinegar, 2 lb. extract of logwood, ½ lb. green copperas, ¼ lb. China blue, and 2 oz. nut-galls. Put these in an iron pot, and boil them over a slow fire till they are well dissolved. When cool, the mixture is ready for use. Add to the above ½ pint iron rust, obtained by steeping iron filings in strong vinegar. The above makes a perfect jet black, equal to the best black ebony; and the recipe is a valuable one.

Staining Floor Boards.

Floors.—First, get the wood clean; have some vandyke brown and burnt sienna ground in water; mix it in strong size; put on with a whitewash or new paint brush as easily as you can. When dry, give two coats of copal or oak varnish.

If the floor is a new one, have the border well washed. Polish with glasspaper, rubbing always with the grain of the wood. Varnish with good oak varnish, put colouring matter into the varnish to suit your taste, but umber is best; if the floor is old and blackened, paint the varnish upon it.

Upon old floors, you will not make much of staining anything but black. The floor should be well washed with lime and soda in the water, and the dye painted on it, and, when dry, sized over and varnished with elastic oak varnish.

Take ½ lb. logwood chips, boil them briskly for

half an hour in about 5 qrt. rain water, and strain through muslin. To this liquor add 6 oz. annatto, add also 1 lb. of yellow wax, cut up in very small pieces. Place these over the fire, and let the wax melt gently, stirring it all the while. When melted, take the mixture off the fire before it boils. Then with a paint brush lay it on the floor as hot as possible, brushing it always the way of the grain. Next day polish with a hard flat brush made of hair, which may have a strap nailed to the back of it in which to insert the foot. The floor is afterwards kept bright with beeswax alone, a little of which is melted and put on the brush. Take care that the floor is thoroughly dry before commencing operations.

Green. — Mordant the wood with red liquor. This is prepared by dissolving separately in water 1 part sugar of lead and four parts of alum free from iron; mix the solutions and then add $\frac{1}{32}$ part of soda crystals and let all settle for 12 hours. The clear liquor is decanted off from the sediment of lead sulphate, and is then diluted with water until it marks 1° of Twaddle's hydrometer. The wood when mordanted is dyed green with berry liquor and indigo extract, the relative proportions of which determine the tone of the green.

Or verdigris dissolved in 4 parts water.

Or $4\frac{2}{10}$ oz. copper, cut up finely, are gradually dissolved in 13 oz. nitric acid (aquafortis), and the articles to be stained are boiled in this solution until they have assumed a fine green colour.

The wood, mordanted as above directed, can also be dyed a fine blue with extract of indigo.

Veneer Dying.

Dyeing Veneers Green.—Put the veneers in a box or trough with clean water, and let them remain immersed for three or four days, changing the

water once or twice, as occasion may require. Let them dry about twelve hours before they are put into the dye; by observing this the colour will strike quicker and be of a brighter hue. Prepare the dye as follows: To 1 gall. of strong vinegar add 1 lb. of the best verdigris, finely ground, 2 oz. sap green, and 2 oz. indigo. Place this in an iron or copper vessel, with as many of the veneers as the liquor will cover, and boil for several hours, or until the requisite intensity of colour is obtained.

Staining Grey.—Greys may be produced by boiling 17 oz. orchil paste for half an hour in 7 pints water. The wood is first treated with this solution, and then, before it is dry, steeped in a liquor of iron nitrate. An excess of iron gives a yellowish tone; otherwise a blue grey is produced, which may be completely converted into blue by means of a little potash.

Or use 1 part silver nitrate dissolved in 50 parts of distilled water; wash over twice; then, with hydrochloric acid, and afterwards with water of ammonia. Allow the wood to dry in the dark, and then finish with oil and polish.

Light Mahogany Stain.—Boil ½ lb. madder and 2 oz. logwood chips in 1 gall. water, and brush well over while hot. When dry, go over with pearlash solution, 2 drm. to the qrt. By using it strong or weak the colour can be varied at pleasure.

Or soak 1 lb. stick varnish in 2 qrt. water until all the colour is dissolved out; strain off the water, and add to the residue 25 drm. powdered madder. Set the mixture over the fire until it is reduced to ¾ of its original volume. Then mix together 25 drm. cochineal, 25 drm. kermes berries, 1 pint spirits of wine and ½ oz. pearlash. Add this mixture to the decoction of madder and varnish, stirring well to-

gether, and adding so much aquafortis as will bring the red to the desired shade.

Dark Mahogany Stain.—Introduce into a bottle 15 gr. alkanet root, 30 gr. aloes, 30 gr. powdered dragon's blood and 500 gr. 95 per cent. alcohol, closing the mouth of the bottle with a piece of bladder, keeping it in a warm place for three or four days, with occasional shaking, then filtering the liquid. The wood is first mordanted with diluted nitric acid, and, when dry, washed with the stain once or oftener, according to the desired shade.

Fancy Wood Stains.

Boil 8 oz. madder, 9 oz. rasped yellow wood, for one hour in $5\frac{1}{4}$ lb. water, and the boiling liquor is to be applied to the articles until the desired colour has been produced.

Or digest 1 oz. powdered turmeric and 1 oz. powdered dragon's blood, $8\frac{3}{4}$ oz. of 80 per cent. strong alcohol, and when the latter seems to be thoroughly coloured it is filtered through a cloth. The filtrate is heated and applied warm to the article.

Or boil 17 oz. madder, $8\frac{3}{4}$ oz. ground logwood, for one hour in $5\frac{1}{4}$ lb. water. This is filtered while still warm, and the warm liquor is applied to the wood. When this has become dry, and it is desired to produce a darker mahogany colour, a solution of $\frac{1}{2}$ oz. potash carbonate in $4\frac{1}{4}$ lb. water is applied to the wood. This solution is prepared cold, and filtered through blotting paper.

Or boil 7 oz. logwood in 3 oz. water down to about one-half. This is then filtered, and $\frac{3}{4}$ oz. baryta chloride is dissolved in it.

Or water, 1 gall.; madder, 8 oz.; fustic, 4 oz. Boil, lay on with a brush while hot, and while wet streak it with black to vary the grain. This imitates Honduras mahogany.

Spanish Mahogany Stain.

Madder, 8 oz.; fustic, 1 oz.; logwood, 2 oz.; water, 1 gall. Boil, and lay on while hot. This imitates Spanish mahogany. Varnish in the usual way with the following: Put in a bottle 2 oz. gum sandarac, 1 oz. shellac, ½ oz. gum benjamin, 1 oz. venice turpentine, 1 pint 90 per cent. alcohol. Colour red with dragon's blood, or yellow with saffron. Stand in a warm spot till gum dissolves, when strain for use.

Or boil 1 part logwood in 8 parts water. Apply this decoction to the wood. When dry give it two or three coats of the following varnish: 1 part dragon's blood dissolved in 20 parts of 90 per cent. alcohol.

A Coloured Varnish for Dark Stained Woods.

Rectified naphtha, 1 pint; amber resin, 4 oz.; gum shellac, 2 oz.; terra sienna, 1 oz.; dragon's blood, 1¼ oz. Let it stand in a warm place for two days; shake frequently. Strain through muslin before use.

To Stain Beech a Mahogany Colour.

Put 2 oz. of dragon's blood, broken in pieces, into a qrt. of 90 per cent. alcohol; let the bottle stand in a warm place, shake it frequently; when dissolved it is fit for use.

Another Stain to Imitate Mahogany.

Plane the surface smooth, and rub with a solution of nitrous acid. Then apply with a soft brush 1 oz. of dragon's blood dissolved in about 1 pint of alcohol, and with ⅓ of an ounce of carbonate of soda mixed and filtered. When the brilliancy of the polish diminishes, it may be restored by the use of a little cold drawn linseed oil.

Metallic Stains for Wood.

Soaking the wood in a weak solution of nitrate

of silver, and then exposing it to the light, will produce an intense black colour. Another way is to boil some chips of logwood in water for about a quarter of an hour. Then wash the piece of wood with it three or four times, allowing it to dry after each washing. Lastly, wash the wood, by means of a common painting brush, with a mixture prepared as follows: Put 1 oz. of steel or iron filings into 2 oz. of vinegar, keep the phial near the fire so as to be gently heated for about two hours, then decant the vinegar and keep it for use.

Yellow-Brown Stain for Woods.

Oak.—1. Mix powdered ochre, venetian red and umber, in size, in proportions to suit; or a richer stain may be made with raw sienna, burnt sienna and vandyke. A light yellow stain of raw sienna alone is very effective.

2. *Darkening Oak.*—Lay on liquid ammonia with a rag or brush. The colour deepens immediately and does not fade, this being an artificial production of the process which is induced naturally by age. Potash bichromate, dissolved in cold water and applied in a like manner, will produce a very similar result.

German Method to Darken New Oak Timber.

In Germany the cabinet-makers use very strong coffee for darkening oak. To make it very dark: Iron filings with a little sulphuric acid and water, put on with a sponge, and allowed to dry between each application until the right hue is reached.

To Darken Carved Oak.

Whitewash with fresh lime, and when dry brush off the lime with a hard brush and dress well with linseed oil. It should be done after the wood has been worked, and it will make not only the wood, but the carving or moulding, look old also.

Or use a strong solution of common washing soda, say one or two coats, until the proper colour is obtained. Or you may try potash carbonate. Paper and finish off with linseed oil.

Or a decoction of green walnut shells will bring new oak to any shade, or nearly black.

To Darken Oak by Ammonia Gas.

A good method of producing the peculiar olive brown of old oak is by fumigation with liquid ammonia; the method has many advantages, except for the expense of making a case or room air-tight and the price of the ammonia. It does not raise the grain, the work keeping as smooth as at first. Any tint, or rather, depth of the colour, can be given with certainty; and the darker shade of colour will be found to have penetrated to the depth of a veneer, and much farther where the end grain is exposed, thus doing away with the chance of an accidental knock showing the white wood. The colouring is very even and pure, not destroying the transparency of the wood. It is advisable to make the furniture from one kind of stuff, not to mix English oak with Riga, and so on. They both take the colour well, but there is a kind of American red oak that does not answer well. In all cases care must be taken to have no glue or grease on the work, which would cause white spots to be left. The deal portions of the work are not affected in the least, neither does it affect the sap of oak. The best kind of polish for furniture treated in this manner is wax polish, or the kind known as egg-shell polish. The process of fumigation is very simple. Get a large packing case, or better still, make a room in a corner of the polishing shop, about 9 ft. long, 6 ft. high and 3 ft. 6 in. wide. Paste paper over the joints; let the door close on to a strip of india-rubber tubing; put a pane of glass in the side

of box or house to enable you to examine the progress of colouring. In putting in your work see that it does not touch anything to hinder the free circulation of the gas.. Put two or three dishes on the floor to hold the ammonia, about ½ pint of which is sufficient for a case this size.

Brown Oak Stain.

A good brown oak stain is produced by preparing the wood with a solution of 1 oz. catechu, boiled in 1½ pint of water. When dry, brush over with a solution of bichromate of potash, 1 oz. to 1½ pint of water.

Orange Stain.

Yellow or orange stains generally result from the use of nitric acid or turmeric. Thus 2 oz. finely powdered turmeric are digested for several days in 17 oz. 80 per cent. alcohol, and then strained through a cloth. This solution is applied to the articles to be stained.

Purple Stains for Wood.

Logwood chips . . .	1 lb.
Water	¾ gall.
Pearlash	4 oz.
Powdered indigo . . .	2 oz.

Boil the logwood in the water till the full strength is obtained, then add the pearlash and indigo, and when the ingredients are dissolved the mixture is ready for use, either warm or cold. This gives a beautiful purple.

Chocolate-Purple Stain.

To stain wood a rich purple or chocolate colour, boil ½ lb. madder and ¼ lb. fustic in 1 gall. water, and when boiling brush over the work until stained.

Or rasped logwood, 2 lb. 2 oz., rasped Lima red dyewood, 5 lb. 5 oz., are boiled together for one hour in 5 lb. 5 oz. water. It is then filtered through a cloth

and applied to the article to be stained until the desired colour has been obtained. In the meanwhile a solution of $\frac{3}{4}$ oz. potash carbonate in 17 lb. 5 oz. water has been prepared, and a thin coat of this is applied to the article stained red. But strict attention must be paid not to apply too thick a coat of this solution, or else a dark blue colour will be the result.

Red Stain for Wood.

The wood is plunged first in a solution of 1 oz. of curd soap in 35 fl. oz. of water, or else is rubbed with the solution, then magenta dye is applied in a state of sufficient dilution to bring out the tone required. All the aniline colours can be used.

Rosewood Stain.

Take alcohol 1 gall., camwood 2 oz., set them in a warm place twenty-four hours, then add extract of logwood 3 oz., aquafortis 1 oz., and when dissolved it is ready for use.

Sixteenth Century Finish for Oak.

Oak may be given the appearance of age by sponging with sulphuric acid and water, equal parts, or, what is preferable, staining with umber in thin shellac varnish.

Violet.

The wood is treated in a bath made up with $4\frac{1}{4}$ oz. olive oil, the same weight of soda ash, and $2\frac{1}{2}$ pints of boiling water, and it is then dyed with magenta, to which a corresponding quantity of tin crystals have been added.

Stains for Violins.

To darken the wood, rub over it nitric acid, sp. gr. 1·2 per cent., and, after standing twelve hours, wash and dry thoroughly. Then use either of the following :—

Prepare a groundwork with strong hot aqueous solution of logwood extract; then apply a solution of 3 oz. potash, 3 oz. red-sanders, $2\frac{1}{2}$ lb. gum shellac, and 1 gall. water, dissolved over a quick fire.

Or boil 1 oz. logwood extract in 1 pint of water (soft), and add $\frac{1}{5}$ oz. cream of tartar. Use the stain hot, and give several coats if necessary, drying between each. Use a saw-edged graining brush and asphaltum varnish, sufficiently thinned, to produce the proper markings.

Artificial Walnut Stains.

Light Walnut.—Dissolve 1 part potassium permanganate in 30 parts of pure water, and apply twice in succession; after an interval of five minutes wash with clean water, and, when dry, oil and polish.

Dark Walnut.—Same as for light walnut, but after the washing with water the dark veins are made more prominent with a solution of iron acetate.

Or in the winter season get some ripe privet berries, which grow in most gardens, and put 2 oz. in $\frac{1}{2}$ pint solution of liquid ammonia. This, applied to pine, varnished or polished, cannot be detected from real walnut itself.

Or take 1 gall. very thin size shellac; add 1 lb. dry burnt umber, 1 lb. dry burnt sienna, and $\frac{1}{4}$ lb. lampblack. Put these articles into a jug, and shake frequently, until they are mixed. Apply one coat with a brush. When the work is dry rub down with fine paper, and apply one coat of shellac or cheap varnish. It will then be a good imitation of solid walnut, and will be adapted for the back-boards of mirror frames, for the back and inside of casework, and for similar work.

Or take 1 gall. strong vinegar, 1 lb. dry burnt umber, $\frac{1}{2}$ lb. fine rose-pink, $\frac{1}{2}$ lb. dry burnt vandyke brown. Put into a jug, and mix well; let the mixture stand one day, and it will then be ready for use. Apply this stain to the sap with a piece of fine sponge. It will dry in half an hour. The whole

piece is then ready for the filling process. When the work is completed the stained part cannot be detected, even by those who have performed the job. By means of this recipe wood of poor quality and mostly of sap can be used with good effect.

Darkening Natural Walnut Wood.—Slaked lime 1 part, to 4 parts of water, will do for some kinds of walnut; a weak solution of iron sulphate for others; and, yet again, for other kinds, a weak solution of pearlash. Try each on the wood, and choose the one you like best.

Or to give to walnut a dark colour, resembling rosewood, Hirschberg uses a solution of $\frac{3}{4}$ oz. potash bichromate in 1 oz. water. This solution should be applied to the walnut with a sponge, and the wood then pumiced and polished.

Stain to imitate Walnut Veneer.—By a simple staining, furniture of pine or birch wood can be easily made to appear as if it had been veneered with walnut veneer. For this a solution of 4 oz. potash manganate and 4 oz. manganese sulphate in $5\frac{1}{4}$ qrt. hot water is made. This solution to be applied to the wood with a brush, and must be repeated several times. The potash manganate is decomposed when it comes in contact with the woody fibre, and thus a beautiful and very durable walnut colour is obtained. If small wooden articles are to be stained in this manner, a very diluted bath is prepared; the articles are dipped into it, and kept there one to nine minutes, according as the colour is desired lighter or darker.

Or water 1 qrt., sal-soda $\frac{1}{2}$ oz., vandyke brown $2\frac{1}{2}$ oz., potassium bichromate $\frac{1}{4}$ to $\frac{1}{2}$ oz. Boil for ten minutes, replacing water lost by evaporation. Use hot, and allow the work to dry thoroughly before oiling or varnishing.

Walnut Stain for hard-wood Furniture.—Spirits

of turpentine 1 gall., pulverised asphaltum 2 lb. Dissolve in an iron kettle on a stove, stirring constantly.

Black Walnut Stains.—A decoction of green walnut husks dried and boiled in lye is recommended.

Or dragon's blood and lampblack mixed in wood alcohol may be used, well rubbed into the wood.

Or 1 gall. strong vinegar, 1 lb. dry burnt umber, ½ lb. fine rose-pink, ½ lb. dry burnt vandyke brown. After mixing and standing for a day it is ready for use. Apply with a sponge.

Imitation Rosewood.

Take 1 lb. of logwood chips, ½ lb. of red-sanders, ½ gall. of water. Boil over a fire until the full strength is obtained. Apply the mixture, while hot, to the wood with a brush. Use one or two coats to obtain a strong red colour. This stain applied to birch-wood gives as good an imitation of rosewood as on black walnut, the shade on the birch being a little brighter.

Yellow Stains for Hard Woods.

Mordant with red liquor, and dye with bark liquor and turmeric. Dissolve the turmeric in wood naphtha.

By aqua regia (nitro-muriatic acid), diluted in 10 parts water, a much-used though rather destructive yellow stain, may be used.

Nitric acid also gives a fine permanent yellow, which is converted into dark brown by subsequent application of tincture of iodine.

Wash over with a hot concentrated solution of picric acid, and, when dry, polish the wood.

To give Orange-Yellow Tone to Oak-wood.

According to Niedling, a beautiful orange-yellow tone, much admired in a chest at the Vienna Exhibition, may be imparted to oak-wood by rubbing it in a warm room with a certain mixture until it acquires a dull polish and then coating it, after an hour, with

thin polish, and repeating the coating of polish to improve the depth and brilliancy of the tone. The ingredients for the rubbing mixture are, about 3 oz. tallow, $\frac{3}{4}$ oz. wax, and 1 pint oil of turpentine, mixed by heating together and stirring.

Or digest 2 oz. finely powdered turmeric for several days in $17\frac{1}{4}$ oz. alcohol, 80 per cent. strong, and then strain through a cloth. This solution is applied to the articles to be stained. When they have become entirely dry they are burnished and varnished.

Or dissolve $1\frac{1}{2}$ oz. potash carbonate in $4\frac{1}{6}$ oz. rain-water. This solution is poured over $\frac{1}{2}$ oz. annatto, and this mixture is allowed to stand for three days in a warm place, being frequently shaken in the meanwhile. It is then filtered, and $\frac{1}{4}$ oz. spirit of sal-ammoniac is added to it. The stain is now ready, and the articles to be stained will acquire a very beautiful bright yellow colour by placing them in it.

Bright Golden Yellow for Wood Ornaments.

Digest $\frac{1}{2}$ oz. finely powdered madder for twelve hours with 2 oz. diluted sulphuric acid, and then filter through a cloth. The articles to be stained are allowed to remain in this fluid three to four days, when they will be stained through.

Contrast Colours for Painting Machinery.

Deep blue and golden brown. Black and warm brown. Chocolate and light blue. Maroon and warm green. Deep red and grey.

Copper Paint.

Precipitate metallic copper out of any solution of a copper salt by introducing scrap iron into the liquid. Then mix the precipitated copper with linseed oil or varnish.

To Refine Ox-gall for Artistic Uses.

For fixing chalk and pencil drawings and removing grease.

Allow fresh ox-gall to repose for twelve or thirteen hours; decant the clear liquid and evaporate to the consistence of a thick syrup in a water-bath. Then spread it thinly on a dish and expose it before the fire, or to a current of air, until nearly dry. It will then keep for years in wide-mouthed bottles or pots covered over with bladder. For use, a little is dissolved in water.

Or fresh gall, 1 pint, boil and skim, add powdered alum 1 oz.; boil again until the alum is dissolved, and, when cool, pour it into a bottle and loosely cork it down.

In a similar manner boil and skim another pint of gall, and add to it 1 oz. of common salt; boil till dissolved, and cool and bottle as above. In three months decant the clear from both bottles and mix them in equal quantities.

It is employed by artists to fix chalk and pencil drawings before tinting them, and to remove greasiness from ivory, tracing-paper, etc. It is also used to extract grease and oil from clothes; for the latter purpose it answers admirably.

TABLE SHOWING THE COMPOSITION OF THE DIFFERENT COATS OF WHITE PAINT AND THE QUANTITIES REQUIRED TO COVER 100 YARDS OF NEWLY WORKED PINE.

—	Red Lead.	White Lead.	Raw Linseed Oil.	Boiled Linseed Oil.	Turpentine.	Driers.	Remarks.
Inside work, four coats not flatted.	lb.	lb.	pt.			lb.	
Priming	½	16	6	..	..	¼	Sometimes more red lead is used and less drier.
Second coat	*	15	3½	..	1½	¼	
Third coat	..	13	2½	..	1½	¼	* Sometimes just enough red lead is used to give a flesh-coloured tint.
Fourth coat	..	13	2½	..	1½	¼	
Inside work, four coats and flatting.							
Priming	1½	16	6	..	½	1–8	
Second coat	..	12	4	..	1½	1–10	
Third coat	..	12	4	..	0	1–10	
Fourth coat	..	12	4	..	0	1–10	
Flatting	..	9	0	.	3½	1–10	When the finished colour is not to be pure white, it is better to have nearly all the oil boiled oil. All boiled oil does not work well. For pure white a larger proportion of raw oil is necessary, because boiled oil is too dark.
Outside work, four coats not flatted.							
Priming	2	18½	2	2	..	1–8	
Second coat	..	15	2	2	½	1–10	
Third coat	..	15	2	2	½	1–10	
Fourth coat	..	15	3	2½	0	1–10	

Receipt for Making Anti-Corrosive Paint.

Take equal parts by weight of whiting and white lead, with half the quantity of fine sand, gravel, or road dust, and a sufficient quantity of colouring matter. This mixture is made in water, and can be used as a water colour; but it is more durable to dry it in cakes or powder after mixing, and then use it as an oil paint by grinding it again in linseed oil. The preparation of oil recommended for this purpose is 12 parts by weight of linseed oil; 1 part boiled linseed oil, and 3 parts sulphate of lime, well mixed. One gallon of this prepared oil is used to 7 lb. of the powder.

Paint for Bird Cages.

Paint with zinc. Do not use lead. The zinc can be given any desired tint. It is then coated with light polishing copal varnish, after which it is baked or heated at from 100° to 150° F. The varnish known in the trade as extra light polishing varnish is used by several of the prominent bird-cage makers.

Blackboards, Paint or Slating for Schools.

Take ½ lb. logwood and sufficient boiling water to cover it; allow it to stand for twenty-four hours. Strain, and apply the solution, boiling, if possible, twice, allowing the board to dry in the interval. Then dissolve ¼ lb. of copperas in about 1 pint of boiling water, and apply it boiling, once or twice, according to the degree of blackness obtained. Before using it, rub it over well with rushes, straw, ferns, or shoemakers' heel ball. It may be a little difficult to rub the chalk off at first, but after a fortnight's use that will disappear. Use unprepared chalk, which writes well.

Or place ¼ lb. lampblack on a flat piece of tin

or iron on a fire till it becomes red, take it off, and leave it until sufficiently cool, when it must be crushed with the blade of a knife on a flat board quite fine; then get ½ pint of spirits of turpentine, mix both together, and apply the mixture with a size brush. If the board is new, it would be well to give it one or two coats of lampblack—not burnt, but mixed with boiled oil—adding ½ lb. of patent driers. After the board is thoroughly dried, apply the burnt lampblack and turpentine. The preparation must be laid on quickly.

Or dissolve 4 oz. shellac in 1 qrt. alcohol; add lampblack, 6 drm.; ultramarine blue, 1 drm.; pumice stone, powdered, 3 oz.; rotten stone, powdered, 2 oz. Have the board dry and free from grease before painting it.

Or sodium silicate, diluted with water, and coloured with lampblack, suspended in a little of the silicate, makes an excellent slating.

Or lampblack and flour of emery mixed with spirit varnish. No more lampblack and flour of emery should be used than are sufficient to give the required abrading surface. The thinner the mixture the better. Lampblack should be first ground with a small quantity of spirit varnish or alcohol to free it from lumps. The composition should be applied to the smoothly planed surface of a board with a common paint-brush. Let it become thoroughly hard and dry before it is used. Rub it down with pumice if too rough.

Blackboard wash, or liquid slating.—Five pints 95 per cent. alcohol, 8 oz. of shellac, 2 drm. lampblack, 20 drm. ultramarine blue, 4 oz. powdered rottenstone, 6 oz. powdered pumice, and paint it upon the board with a common painter's brush.

Or 1 gall. 95 per cent. alcohol, 1 lb. shellac, 8 oz. best ivory black, 5 oz. finest flour emery, 4 oz. ultramarine blue. Make a perfect solution of the

shellac in the alcohol before adding the other articles. To apply the slating, have the surface smooth and perfectly free from grease; well shake the bottle containing the preparation, and pour out a small quantity only into a dish and apply it with a new flat varnish brush as rapidly as possible. Keep the bottle well corked, and shake it up each time before pouring out the liquid.

Or ½ gall. shellac varnish, 5 oz. lampblack, 3 oz. powdered iron ore or glass. If too thick, thin with alcohol. Give three coats of the composition, allowing each to dry before putting on the next. The first may be of shellac and lampblack alone.

Or to make 1 gall. of the paint for a blackboard, take 10 oz. pulverised and sifted pumice, 6 oz. powdered rotten-stone, ¾ lb. good lampblack, and alcohol enough to form, with these, a thick paste, which must be well rubbed and ground together. Then dissolve 14 oz. shellac in the remainder of the gall. of alcohol by digestion and agitation, and finally mix this varnish and the paste together. It is applied to the board with a brush, care being taken to keep the paint well stirred, so that the pumice will not settle. Two coats are usually necessary. The first should be allowed to dry thoroughly before the second is put on, the latter being applied so as not to disturb or rub off any portion of the first. One gall. of this paint will ordinarily furnish two coats for 60 sq. yds. of blackboard. When the paint is to be put on plastered walls the wall should be previously coated with glue size—1 lb. glue, 1 gall. water, enough lampblack to colour; put on hot.

Paint for Boilers.

1. Use asphaltum varnish. There is little or no odour from it when dry.

2. Coal tar and ground graphite thinned with

turpentine make an excellent paint for boiler fronts and pipes in boiler room. The steam pipes for heating should not be painted, or, if required, should only have a very thin coat of lampblack and linseed oil.

Red Branding Paint.

Shellac	2 oz.
Borax	2 oz.
Water	25 oz.
Gum arabic	2 oz.

Boil the borax and shellac in water until they are dissolved, add the gum arabic and withdraw from the fire. When the solution has become cold add venetian red enough to bring it to a suitable consistence and colour.

Bronze Paint for Iron or Brass.

Chrome green	2 lb.
Ivory black	1 oz.
Chrome yellow	1 oz.
Good japan	1 gill.

Grind all together and mix with linseed oil.

Antique Bronze.

Sal-ammoniac	2 oz.
Cream tartar	6 oz.
Common salt	12 oz.

Dissolve in 2 pints hot water, then add 4 oz. nitrate of copper dissolved in 1 pint of water, mix well, and apply with a brush several times to the article, in a damp situation.

Cheap Paint for Brick Walls.

Three hundred parts washed and sieved white sand, 40 parts precipitated chalk, 50 parts resin and 14 parts linseed oil are mixed and boiled in a iron kettle, and then 1 part oxide copper and 1 part sul-

phuric acid are added. This mass is applied with an ordinary paint-brush while warm. If it is too thick it should be diluted with linseed oil. This paint dries very rapidly, gets very hard, and is a perfect protection against damp penetrating porous bricks.

To Clean off Paint.

Mix 1 part, by weight, of pearlash with 3 parts quick stone lime, by slaking the lime in water, and then adding the pearlash, making the mixture about the consistence of paint. Lay the above over the whole of the work required to be cleaned with an old brush, let it remain 14 or 16 hours, when the paint can be easily scraped off.

Distemper for Photographic Backgrounds.

Whiting	1½ to 2 lb.
Lampblack	3 oz.
Damp blue	4 oz.
Glue	1½ oz.

Dissolve the whiting in 2 qrt. water, add nearly all the blue, then add the black, gradually. After each addition dip a piece of paper in it, and dry at the fire till it shows the exact colour you require. Then, having dissolved the glue in warm water, pour it in.

Economical Paint.

Skim milk	2 qrt.
Fresh slaked lime	8 oz.
Linseed oil	6 oz.
White burgundy pitch	2 oz.
Spanish white	3 lb.

The lime to be slaked in water, exposed to the air, and mixed in one-fourth the milk. Dissolve

the pitch in the oil, and add a little at the time. Then add the rest of the milk and the Spanish white.

Flexible Paints for Oil Cloths.

1. Size the cloth with hot soap and alum solutions, used alternately. Dry, and enamel with colours ground fine in oil, with plenty of driers and a little turpentine. Finish with a thin copal varnish, if high gloss is desired. Harden, by drying at about 200° F.

2. The following retains sufficient flexibility to enable the sheet to be rolled:

Soft soap.	2 oz.
Boiling water	12 oz.

Dissolve, and work well into 6 lb. of any oil paint.

To Colour Floor Borders.

Use fine umber, mixed with oil and a little turpentine.

Glass, Transparent Paint for.

Take, for blue pigment, prussian blue; for red, crimson lake; for yellow, Indian yellow; and for other shades a mixture of the appropriate primary colours. Rub them in a size made as follows: Venice turpentine, 2 parts; spirits of turpentine, 1 part; and apply with a brush. The colours are moderately fast unless exposed too long to direct sunlight. A solution of the various aniline dyes in shellac varnish has also been recommended.

Paints, Mixing.

In mixing paints, observe that for outdoor work you must use principally or wholly boiled oil, unless it be for the decorative part of houses, etc.; then mix as for indoor work. For indoor work use linseed oil, turpentine, and a little drier, observing that the less oil the less will be the gloss, and that for

flatted white, etc., the colour being ground in oil, will scarcely require any further addition of that article, as the object is to have it dull. The best driers are ground litharge and sugar of lead ; the former for dark and middle tints, and the latter for light ones.

Mixing Oil Colours for Paint.

In mixing different coloured paints to produce any desired tint, it is best to have the principal ingredient thick, and add to it the other paints thinner. In the following list of the combinations of colours required to produce a required tint, the first-named colour is the principal ingredient, and the others follow in the order of their importance. Thus, in mixing a limestone tint, white is the principal ingredient, and red the colour of which least is needed, etc., the exact proportions of each depending on the shade of colour required.

List of compound colours, showing the simple colours which produce them :—

Buff.—White, yellow ochre, red.
Chestnut.—Red, black, yellow.
Chocolate.—Raw umber, red, black.
Claret.—Red, umber, black.
Copper.—Red, yellow, black.
Dove.—White, vermilion, blue, yellow.
Drab.—White, yellow ochre, red, black.
Fawn.—White, yellow, red.
Flesh.—White, yellow ochre, vermilion.
Freestone.—Red, black, yellow ochre, white.
French Grey.—White, prussian blue, lake.
Grey.—White lead, black.
Gold.—White, stone ochre, red.
Green Bronze.—Chrome, green, black, yellow.
Green Pea.—White, chrome green.
Lemon.—White, chrome yellow.
Limestone.—White, yellow ochre, black, red.

Olive.—Yellow, blue, black, white.
Orange.—Yellow, red.
Peach.—White, vermilion.
Pearl.—White, black, blue.
Pink.—White, vermilion, lake.
Purple.—Violet, with more red and white.
Rose.—White, madder lake.
Sandstone.—White, yellow ochre, black, red.
Snuff.—Yellow, vandyke brown.
Violet.—Red, blue, white.

Durable Paint for Outdoor Work.

Grind powdered charcoal in linseed oil, with sufficient litharge as a drier. Thin for use with boiled linseed oil.

Marine Paint for Metals in Salt Water.

Red lead, 44 parts ; quicksilver, 24 parts ; thick turpentine, $5\frac{3}{8}$ parts. Mix to proper consistence with boiled linseed oil. Grind or rub the thick turpentine and quicksilver together until thoroughly amalgamated. Then grind this mixture with the red lead and more boiled oil. Use as little oil as is necessary to make the paint lay on well. A coat of oxide of iron paint may be used first to make the marine paint adhere firmly.

To Paint Metals.

Paint frequently peels off when exposed to the weather. This can be prevented if the metal is, before applying the paint, slightly corroded by a solution of copper sulphate slightly acidulated with nitric acid. After standing in this mixture an hour or so, wash off and dry, and then paint.

India-rubber Paint.

An extremely durable paint may be made by first macerating rubber in any of the solvents until

of a pasty consistence, then dissolving it in linseed oil, and heating until the solvent is evaporated, and then grinding in a proportionate quantity of graphite.

Silicate Paint.

Dilute silicate of soda solution until it works well with the brush, and add dry colouring matter, such as will not be decomposed by the chemical. Ochres, venetian red, smalts, umbers and siennas may be employed.

To Remove Paint from Skins or Leather.

To ¼ lb. of sal-soda add ¼ gall. of rain water. The skins on which the paint is can be made to be of use again by covering them with this mixture, and allowing them to soak about six days, and then washing it off.

To Remove the Smell of Paint.

Place a vessel of lighted charcoal in the room, and throw on it two or three handfuls of juniper berries ; shut the windows, the chimney, and the door close ; twenty-four hours afterwards the room may be opened, when it will be found that the sickly, unwholesome smell will be entirely gone.

Or plunge a handful of hay into a pail of water, and let it stand in the room newly painted.

Stencil Paint.

Take shellac, 2 oz. ; borax, 2 oz. ; water, 25 oz. ; gum arabic, 2 oz. ; lampblack, a sufficiency. Boil the borax and shellac in water till they are dissolved, and withdraw from the fire. When the solution has become cold, complete by adding 25 oz. water, and add lampblack enough to bring the preparation to a suitable consistence. When it is to be used with a stencil it must be made thicker than when it is to be applied with a marking brush. The above gives a

black ink; for red, substitute venetian red for lamp-black; for blue, ultramarine; and for green, a mixture of ultramarine and chrome yellow.

Stove Paint.

Paint the stove with paint made of powdered blacklead and linseed oil, and polish in the ordinary way when dry. It may be left out in all kinds of weather without injury to the polish.

Transparent Paints.

If in a position to coat the glass before putting in frame, excellent effects may be got by using ordinary shellac varnish, made with bleached shellac, tinted with aniline dye. The glass must be slightly warmed before applying the varnish. Ninety per cent. alcohol should be used for dissolving the shellac, and the powdered, not liquid, aniline colours used. Sufficient of the colour must be added to the varnish to give the required tint. One part of shellac to 8 parts of spirit is a good proportion. Methylated spirit will do. The varnish should be poured on and placed evenly over the glass, not painted on, and the superfluous quantity returned to the bottle.

Paint for Submarine Works and Ship-bottoms.

Concentrated solution of 160 lb. potash; grape sugar, 80 lb.; add a solution of 320 lb. sulphate of copper. When this solution is heated a precipitate of hydrated oxide of copper is formed; this is filtered, carefully dried, and mixed with $6\frac{1}{4}$ lb. 75 per cent. carbolic acid. Heat the mass, and add about $9\frac{1}{2}$ gall. crude linseed oil. When this paint is to be used reduce with linseed oil. It is said to be poisonous to animal and vegetable life.

Innocuous Colour for Painting Toys.

White fine chalk, 6 parts; calcined magnesia (thoroughly calcined), 3 parts. Add a few drops of indigo solution.

Substitute for White Oil Paint.

A substitute for white oil paint may be made as follows:—4 qrt. of skim milk, 1 lb. of fresh slaked lime, 12 oz. of linseed oil, 4 oz. of white Burgundy pitch, 6 lb. of Spanish white, to be mixed as follows. The lime to be slaked in water, exposed to the air, and mixed in about $\frac{1}{4}$ of the milk; the oil, in which the pitch must be previously dissolved, to be added a little at a time, then the rest of the milk, and afterwards the Spanish white. This quantity is sufficient for more than fifty square yards covered with two coats.

White Paint for Metallic Surfaces.

Oil paints used on metallic surfaces exposed to heat frequently turn yellow. If, instead of oil, sodium silicate be used no change of colour will be noticed. Zinc white mixed with soluble glass to the consistence of ordinary paint, makes an excellent paint for metals.

Window Paint.

Mix with white lead, boiled oil or varnish, and a small quantity of driers (no turps, which hardens by time, being a volatile oil, and is therefore objectionable in this case); paint this over the glass thinly, and stipple it. If you have not a proper brush make a large pledget of cotton wool or tow, cover it with a clean bit of linen rag, and quickly dab it over the paint.

Golden Yellow Paint.

Mix white with extract of saffron to give the desired shade. When dry these colours should be coated with a light mastic varnish.

To Prepare Zinc for Painting.

Dissolve 1 part of chloride of copper, 1 part of nitrate of copper and 1 part of sal-ammoniac in

64 parts of water, and add 1 part of commercial hydrochloric acid. Brush the zinc over with this, which gives it a deep black; leave it to dry twenty-four hours, when any oil colour will firmly adhere to it, and withstand both heat and damp.

Anti-Fouling Paint.

Composition for ships' bottoms. One which has been thoroughly tested and found to be the best in use.

Double-boiled linseed oil .	2 lb.
Oleate of lead	2 drm.
Oxide of iron (a good quality)	10 oz.
Arsenic	½ oz.
Oxide of antimony . . .	¼ oz.
Sulphate of manganese . .	¼ oz.
White copperas . . .	¼ oz.

The whole to be thoroughly mixed and passed through rollers. Any pigment can be used in lieu of the red oxide of iron. If more gloss is desired, add 4 oz. of manilla copal for top coat.

Composition Paint.

For ships' funnels. Will stand red heat without firing away.

Gold size	1 lb.
Red lead	½ lb.
Turpentine	2 oz.

Add pigment, colour to shade required.

MISCELLANEOUS RECEIPTS.

A Paste for Making Grindstones.

So hard that it will emit sparks when struck with a knife or a steel.

This can be prepared in the following manner :

Powdered glass	29·23 parts
Rock crystal	10·90 ,,
Minium	10·96 ,,
Calcined borax	7·20 ,,
Saltpetre	2·48 ,,
Arsenic	0·60 ,,

Mix with water into a paste, and mould to the desired shape.

Cement.

Calcined lime, sand and quartz are wetted up with dilute hydrochloric acid, and left in stacks for a few hours, then subjected to superheated steam in a closed drum.

A Liquid Glue

Is made by dissolving gelatine glue in nitric ether, in proportions as follows :

Glue	2 oz.
Nitric ether	4 oz.

This is twice as tenacious as that made with hot water, and will resist damp.

To Render Walls Watertight.

Coat them with silicate of soda and chloride of calcium, which forms silicate of lime.

Brown Bronzing for Brass.

Nitric acid	4 drm.
Cyanide of potassium	1 oz.
Water	1 pint

Transfer Ink for Printing in Colours on Biscuited Pottery Ware.

Black oxide of manganese	½ oz.
Soft soap	1 oz.
Glycerine	½ oz.

To be applied to the biscuit ware, from transfers printed on paper in the usual method followed by potters, before dipping into the glaze.

For a blue, use oxide of cobalt.

Cheap Axle-Grease.

Silicate of soda. . . .	1 lb.
Archangel or Stockholm tar .	1 lb.

To give Crystalline Appearance to Tinned Plates.

Take a sheet of tin, and cleanse it from all grease by rubbing over it 1 part of whiting and 1 part of magnesia. Afterwards place the sheet of tin on a plate of iron in an urn or muffle, and heat it to straw colour; then dip it into the following solution for one instant:

Water	14 lb.
Nitric acid (chemically pure) .	3 lb.
Hydrochloric acid . . .	4 lb.
Bichromate of potash . .	2 oz.

Then wash in warm water made slightly alkaline by adding 1 oz. of soda to 1 gall. of water. These sheets of tin can be made any colour—gold, crimson, green, etc.—by coating them with coloured lacquers.

A Frosting Acid for Glass.

Commonly called white acid or French matting acid. This will frost any glass to an appearance equal to ground glass, in a few seconds. The glass must be previously freed from greasiness.

Fluoric acid	1 oz.
Fluoride of ammonia .	1 oz.
Fluoride of barium . .	1 oz.

Lay the glass in a leaden dish, and pour the fluoric acid and fluoride of ammonia over it gradually, and let it lie two hours. This compo should be mixed in a leaden or gutta-percha vessel and kept in gutta-percha bottles; it is also highly suited for embossing glass.

N.B.—We may note that fluoric compounds are

highly dangerous to handle, and should never be touched except by very experienced chemical manipulators.

Artificial Leather.

The leather strips are first steeped in weak lime water, and ground fine in ordinary rag-engines as used by paper-makers. The pulp should next be mixed with about half its bulk of good manila rope pulp, coloured with Venetian red, and is now ready to be made into either leather board, shoe shanks, heels or stiffenings for heels and toes, upon a paper-making machine. The toe shanks can be stamped to the proper shape and size by machine moulds and dried, or cut by a machine from the leather board after drying.

Leather scrap can also be shredded and mixed with strong liquid ammonia, which forms a gelatinous mass; it is soluble in water, and has no elasticity until it is mixed with indiarubber dissolved in bisulphide of carbon and well kneaded, which renders it waterproof. Preparation for making sole leather is:

Rubber	25 parts
Ammonia	67 ,,
Leather	67 ,,

For heels:

Rubber	25 parts
Ammonia	80 ,,
Leather	80 ,,

A Useful Cement for Bottle Sealing.

White resin	1 oz.
Beeswax (white)	1 drm.

Melt, and stir in with a very fine ground marble dust.

Resist for Glass Embossing.

Asphaltum (the Egyptian)	1 oz.
Beeswax	1 oz.
Turpentine	6 oz.

Dissolve cold, and paint the letters or figures on the glass with a brush. This entirely supersedes the old-fashioned pitch preparation.

White or Coloured Enamels.

For watch or clock dials, or any kind of metals.

Take gum dammar 1 lb., and melt it over a methylated spirit stove, then stir in oxide of zinc ½ lb. Thoroughly mix; when cold, chip it out with a chisel and re-grind.

This compo can be tinted by adding vermilion or other metallic pigment colours to the powdered basis before application to the articles to be enamelled. The composition can be melted after being spread in powder over the metal by a gas, spirit or blow-pipe jet.

A remarkably Hard Compo equalling Metal.

Take blast furnace slag, 75 per cent., soda silicate, 18 per cent., and lime 15 per cent.; melt together in a furnace, and cast into moulds.

For door and window-sills, as a substitute for stone, or for ornamental uses.

Printing in Gold Bronze

Direct from the type or stone without dusting.

Take silicate of soda, the thick solution, two parts; phosphoric acid, dilute, 2 per cent.; and one part bronze by weight, and apply in the ordinary way followed by printers. If the compo is too thick, thin with a little dilute phosphoric acid and water.

To make Printing-Ink dry with a Gloss.

For lithographic printers.

Canada balsam	2 oz.
Balsam copaibi	1 oz.

Add this to about 56 oz. of printing-ink.

For Cleaning Type.

Polysulphine	1 lb.

Dissolve in 2 gallons of hot water; or a strong solution of pearlash in water.

Preparation for Cleaning Saddles.

Egyptian Asphaltum*	1½ oz.
Double-boiled linseed oil	2 qrt.
Sulphate of manganese	2 oz.

* From tar distillers.

Permanent Marking-Ink for Linen.

Nitrate of silver	2 parts
Distilled water	4 parts
Gum arabic	2½ parts
Carbonate of soda in crystals	3 parts
Liquid ammonia	5 parts
Sap green	1 part

First dissolve the silver in the liquid ammonia and the gum arabic, soda and sap green in the distilled water. The two solutions are then mixed together; it is then ready for use.

Another Formula for the same purpose.

No. 1 Solution.

Chloride of copper	8½ grains
Distilled water	30 ,,
Common salt	10 ,,
Liquid ammonia	9½ ,,

No. 2 Solution.

Hydrochlorate of aniline	30 ,,
Distilled water	20 ,,

Solution of gum arabic (containing 2 parts water, 1 part gum arabic)	20 grains
Glycerine	10 grains

Mix 1 part of No. 1 solution and 4 parts of No. 2.

The linen requires no previous preparing when using either of these inks.

Copying-Ink.

Copperas	4 oz.
Nut galls	12 oz.
Logwood	8 oz.
Vinegar	8 oz.
Gum arabic	1 oz.
Glycerine	½ oz.
Water	48 oz.

Boil the above together for an hour, then filter. This ink will copy well. If required to be thickened, a little treacle may be added.

For Marble-Masons' Letterings.

Shellac	1 lb.
Methylated spirit (64 overproof)	25 oz.

Dissolve thoroughly when going to be used; stir in blacklead in powder to a thick paste. This is for filling in letters where desired to show black on a white ground.

Wash for the Preservation of Sandstone from Decay.

Alum	4 oz.
Sugar of lead	2 oz.
Water	1 gall.

Brush over the stone.

Black Hair-Dye.

No. 1 *Solution.*

Pyrogallic acid	1 drm.
Distilled water	2 oz.
Methylated spirit	½ oz.

No. 2 *Solution.*

Nitrate of silver	2 drm.
Distilled water	3 oz.

The hair must be thoroughly washed and freed from all grease, then dried. No. 1 solution to be applied with a brush and allowed to dry. No. 2 solution is then applied, and allowed to remain until the colour is produced.

Permanganate of potash also makes a good dye, a dark brown.

Carpet Soap.

Fullers' earth	4 oz.
Pipe-clay	1 oz.
Carbonate of ammonia	4 oz.
Ox-gall	1 pint

Mix together and apply with a sponge ; or mix this with 4 oz. of soft soap in the water going to be used to wash the carpet. This will not only cleanse the carpet, but will revive the colours.

Teeth-Stopping.

There have been a great number of preparations introduced for stopping teeth, but we have never seen one that will resist the action of the saliva (which is most treacherous) so well as the following. We therefore only give one formula, which is the best and latest up to date.

Oxide of alumina	½ oz.
Silicate of soda	1 oz.
Sulphate of manganese	1 drm.

Mix with the silicate of soda immediately before using.

Valuable Preparation for the Teeth

When people clean their teeth in the morning they make a very great mistake, because they allow the tartar and acids to accumulate overnight, thus forming a deposit or coating upon the back of the teeth. The proper time to clean them is at night, avoiding chalk, camphor and other deleterious ingredients, which are not only injurious to the teeth, but to the lips and gums. The following will be found most efficacious in neutralising and preventing all deposits and incrustations :

Bicarbonate of soda	2 drm.
Borax	½ drm.
Water	1 pint.
Rosewater	½ oz.

Clean back of the teeth as well as the front.

Razor Paste.

Flour emery	1 oz.
Neatsfoot oil	1 oz.
Glycerine	1 drm.

Mix or levigate this mixture, then place it in a pill-box or metal tube, and spread a little with a knife on a leather strop. The razor should be placed in hot water, and well stropped before using ; this will cleanse the razor from the oil, and cause it to cut perfectly. This paste will keep for twelve months. As much can be made for 1*d.* as would cost 1*s.*, and superior to any in use. Razors should never be put away wet after using, otherwise the edge will imperceptibly rust.

To Clean Oil Paintings.

Go over the picture with a cut potato ; this will remove all dirt. Commence at one corner and gradually work down, rubbing in circles. This will be found to give excellent results, and not interfere with the colours.

French Polish Reviver.

Linseed oil	16 oz.
Black resin	4 oz.
Vinegar	4 oz.
Naphtha	3 oz.
Butter of antimony	1 oz.
Spirits of salts	2 oz.

Melt the resin and the oil; stir in the vinegar, when cool, and the other ingredients; and bottle for use.

Albumen in Powder.

Expose white of egg, or serum of bullock's blood, in thin layers to a current of dry air until it concretes into a solid transparent substance like horn. In this state it may be kept for any length of time. When dried to brittleness, it can be powdered and bottled.

A Glue.

Dissolve caseine in a strong solution of bi-carbonate of soda and hot water.

Bleachers' Permanent Ink.

For name-marking cotton and other goods, and which will stand chlorine.

Gas tar	2 oz.
Benzole	½ oz.
Asphaltum	¼ oz.
Turpentine	½ oz.

Thin the gas tar with the benzole, then dissolve the asphaltum in the turpentine, and mix all together in a mortar, or through a paint-mill, when it will be ready for use.

Dye Soaps.

Take common white or coloured yellow soap, 1 lb., and mix with it the following:—Aniline 1 drm.

and dissolve it in 2 oz. of gin and 2 oz. of water, then work it up in a clear paste, and mould it to shape.

The New Mich Method of Tanning Leather.

About 30 per cent. cheaper than with tan, and only a few days required to tan light hides, and a week for heavier.

Done as follows:—The green hides are depilated in the usual way; they are then placed in a solution of bichromate of sodium, or bichromate of magnesium and alum, or sulphate of alumina and chloride of soda, and allowed to remain until saturated.

HOUSEKEEPING RECEIPTS.

Ivory Jelly.

Take ivory dust, 2 lb., wash in three or four waters, let it stand for 12 hours in water to soften; then boil it for two or three hours gently in 2 quarts of water; pour off the jelly, flavour with orange, raspberry, etc.

Ginger Beer.

Bruised ginger	25 oz.
Water	18 gall.
White sugar	20 lb.
Lemon juice	18 oz.
Honey	1 lb.
White of one egg.	
Essence of lemon	½ oz.

Boil the ginger and water for half an hour, add the sugar, lemon juice, honey, essence of lemon; then strain through a cloth; when cold add the white of one egg. This should stand four days to ferment; bottle off, keep for three or four weeks.

Ginger Wine.

Bruised ginger	3 oz.
Water	4 gall.
White sugar (Tate's No. 1)	5 lb.
Solid yeast	½ oz.
Cream of tartar	2½ oz.
Essence of lemon	20 drops

Boil the ginger in water, and strain (when cold) through flannel. Then add the other ingredients and let all work for a day or two, when skim off the yeast, and clarify with the white of four eggs beaten into a foam. Stir the eggs into the liquor and let it stand for a few days to clarify, and then put into a cask or bottles. A moderate portion of brandy or a few ounces of spirits of wine will prevent the risk of the wine becoming sour or mouldy.

Soluble Essence of Lemon.

Lemon peel (dried)	8 oz.
Lime juice, from limes	½ oz.
Nicholson's gin (17)	1 pint

Raspberry Essence.

Raspberries	1 lb.
Tartaric acid	1 drm.
Nicholson's gin (17)	1 pint
Orris root	½ oz.

Strawberry Essence.

Strawberries	1 lb.
Nicholson's gin (17)	1 pint

Cherry Essence.

Cherries	1 lb.
Oil of almonds	10 drops
Nicholson's gin (17)	1 pint
Tartaric acid	1 drm.

Essence of Ginger.

Ginger	18 oz.
Nicholson's gin (17)	2 qrt.

Non-Alcoholic Ginger Wine.

A Valuable Formula.

Essence of ginger	1 oz.
Sugar syrup	2 oz.
Extract of raisins	1 drm.
Water	1 gall.
Linseed tea	1 oz.
Tonquin bean	½ oz.
Vanilla bean	8 oz.

Let stand for twelve or thirteen days, then strain.

For Preserving Meat.

To make Carbolic Acid Paper for Preserving Meats.—Carbolic acid paper, which is now much used for packing fresh meats for the purpose of preserving them against spoiling, is made by melting 5 parts stearine at a gentle heat, and then stirring in thoroughly 2 parts carbolic acid; after which 5 parts melted paraffin are to be added. The whole is to be well stirred together until it cools, after which it is melted and applied with a brush to the paper.

Preservatives for Milk, Size, or any Article of Food.

No. 1.—Boracic acid, ¼ per cent., dissolved in water.

No. 2.—Salicylic acid, ¼ per cent., mixed in water.

No. 3.—Formic acid, ¼ per cent., mixed in water.

No. 4.—Carbolic acid.

Baking Powder.

Powder and thoroughly dry separately by gentle heat:—

Tartaric acid	½ lb.
Bicarbonate of soda (pure)	¾ lb.
Flour	¾ lb.

Mix them in a dry room, pass the mixture through a sieve, and at once put into packages; this should be packed in tinfoil or close-made paper, and kept dry. Or,

Tartaric acid	5 lb.
Flour	16 lb.
Sesqui-carbonate of soda	8 lb.

In using, 1 or 2 teaspoonfuls are mixed with the dry flour, which is then made up quickly with cold water, and baked immediately.

Increasing the Growth of Hair.

It is a well-known fact that you cannot grow wheat upon barren land, and you cannot grow hair upon a barren scalp. Upon some scalps it is morally impossible to prevent its growth, and in others it is impossible to create it. This is attributable to the want of sap in the skin, like sap in a tree, but the following preparation has been tried in a great number of instances, and proved to be wonderfully successful where it was least expected. The cost is trivial for making a trial, and deserves attention.

Tincture of cantharides	½ drm.
Coal-tar naphtha	1 oz.

Rub into the parts morning and evening, without caring for the odour.

MISCELLANEOUS.

Fixing Opaline Tiles or Mosaics.

First prepare an elastic cement as follows, which provides for expansion and contraction, without cracking the opaline.

India-rubber solution	4 oz.
Carbonate of lead	1 oz.

Mix, and pass over the surface of the brick, one thin coat. When dry, add a second coat, and spread one upon the back of the opal tile you wish to fix over the brick, which then fix and allow to dry.

Composition for Use with Stencil Plates.

Asphaltum (Egyptian)	1 oz.
Beeswax (pure)	1 oz.

Melt in an iron saucepan over a lamp, then pour into warm water, and work into balls.

For Common Use.

Asphaltum (Egyptian)	1 oz.
Beeswax (pure)	¾ oz.

This will make it harder. When used on any surface by aid of a stencil plate, this compo must be melted and painted in with a stiff brush.

To make Canvas Waterpoof and Rotproof.

Take green aniline to shade required, 1 oz., and dissolve it in 2 gall. of hot water. Pass this over the cloth ; when thoroughly dry, give one coat of the following solution :

India-rubber solution	1 oz.
Benzolene	1 qrt.

Tooth Stopping Compound

Which hardens very quickly, and stands the saliva better than anything in use.

Silicate of potash	1 oz.
Flour mica	1 drm.
Carbonate of lime	1 drm.
Oxide of lime	½ drm.

Mix when about to be used.

Perspiration of the Feet.

How to prevent the unpleasant odour without checking the perspiration.

Boracic acid	1 drm.
French chalk (talc)	1 oz.
Carbonate of ammonia	½ drm.
Fullers' earth	2 oz.

Mix thoroughly together, and pepper in the boot.

Liquid Gold for Gilding Marble Letters.

Benzole	4 oz.
Gold bronze	1 oz.
Gum dammar	1 drm.

Dissolve the gums; then mix the bronze. Paint with this the sunken parts of the marble or stone, then gild with japanners' size, or gold leaf. Oxidation will be prevented, and the bronze will not turn colour, but give a greater body to the gold leaf.

Green Solution for Canvas.

Gold size (japanners')	10 oz.
Turpentine	2 oz.
Green alizarine	½ oz.

Dissolve the alizarine in the size, afterwards adding the turpentine.

Top Finish for Covers.

Button lac	12 oz.
Orange lac	5 oz.
Fusil oil	21 oz.

Dissolve the lacs in the oil; and afterwards thin to suit requirements with fusil oil.

Common Oil Varnish.

Melt together

Resin	12 lb.
Drying oil	1½ gall.
Manilla gum (soft)	1 lb.

After removing from the fire, add 6 qts. of warm turpentine, and work the whole compo into an even state.

Carriage Varnish.

Good selected gum anime	7 lb.
Clarified oil	2½ gall.
Litharge	4½ oz.
Acetate of lead.	3 oz.
White copper	3½ oz.

After boiling the compo thin with 5 gall. of warm turpentine, grind all into an equal consistency.

A Very Good Amber Varnish.

Melt

Amber	1¼ lb.

until stringy, then add—

White gum dammar	3 oz.
Hot linseed oil	10 oz.
Turpentine	8 oz.

A Very Hard Amber Varnish.

Amber (melted)	4½ lb.
Boiled oil (hot)	4 gall.

Grind into an equal condition on a slab or a paint-mill.

An Elastic Varnish.

As follows:

Slacked lime	16 oz.
Water	20 oz.
Bisulphate of carbon	10 oz.
India-rubber solution	1 oz.

Mix the bisulphate of carbon with the rubber solution, then add the other ingredients.

Watch Oil for Watches and Instruments.

This is the best that can be obtained.

Pure gallipoli oil should be frozen in ice to precipitate impurities. Keep it under frost for a week. Afterwards, when thawed in the natural

temperature of the air, pour off the clear supernatant portion, and add to that 2 per cent. of neats-foot oil that has stood for three months. This oil can be used for the best watches.

Grease for Carriages.

Melt in an open pan or boiler over a fire, 1 lb. of resin, 1 lb. of Russian tallow; when melted, add gradually, with stirring, 1 lb. of silicate of soda (65 strength); when the mixture discontinues rising, add 1 lb. of corn oil; let it boil for half hour, then strain. This gives a good buttery yellow grease.

To Prevent Iron or Wood from being Destroyed by the Fumes of Sulphuric Acid.

Very useful in chemical works.

Take 10 lb. of coal tar, thin it with coal-tar solvent naphtha; then add—

Benjinely Pitch . . .	¼ lb.
Very fine slate dust . .	½ lb.

Paint two coats on roof or the iron with a brush.

An Adhesive Grease for Machine-Belts, etc.

Russian tallow . . .	10 lb.
Ground-nut oil	50 lb.
Castor oil	50 lb.
Glycerine	½ lb.

This will make them flexible, and augment their clutch on the pulleys.

To Silver Iron Articles.

Methylated spirit (64) . .	15 oz.
Butter of antimony . . .	¾ oz.
Arsenious acid	2 drm.
Bloodstone	1 oz.

Subject the whole to a moderate heat, shaking frequently; polish with the solution: it will give a brilliant silver lustre, and not rust.

To Prevent Boots and Shoes from Squeaking.

Apply the following solution:

India-rubber solution	1 oz.
Benzole	2 oz.

Pass this over the inner sole.

Ordinary Oleomargarine

Is made from the African ground-nut oil, mixed with pea-nut oil.

To make margarine, 200 parts of suet and 300 parts of ground-nut oil are melted and compounded with 5 parts of maize oil, to colour the mixture. The fat, while warm, should be poured through a fine sieve or cloth into a vat, and allowed to thicken whilst constantly agitated.

Another Quality of Margarine.

Suet	200 parts
Ground-nut oil	320 parts
Lard	90 parts
Maize oil	8 parts

Ground-nut oil has this advantage: that it has the flavour of butter and the taste of cream. The nuts before being decorticated are most delicious.

To give Leather the Smell of Russian Leather.

Dress the leather with extract of birch bark dissolved in oil of juniper. Sheep-skin leather is the quality generally used to work upon.

A Very Good Ink for Marking Sheets, Blankets, etc., for Institutions.

Very Cheap and Permanent.

Extract of logwood	4 oz.
Liquor of ammonia	16 oz.
Sulphate of copper	½ oz.

Mix; dissolve and strain.

Liquid Washing Blue.

Take aniline blue, ¼ oz., and dissolve it in spirits of wine, 1 gall. This will mix with water, and not give any sediment whatever.

Extract of Cochineal.

Boil it with double its weight of spirit of ammonia and water in a water-bath, until the spirit of ammonia is volatilised; then mix the fluid with spirit of wine, and filter.

Black Gloss for Leather.

Methylated spirit . . .	1 qt.
Black lac	½ lb.
Gum rubrum	½ lb.

Let the compo stand till all is dissolved and clear; then dissolve 1 oz. of Castile soap in 8 oz. of methylated spirits, and add to it glycerine, 1½ oz.; shake well and mix this with the black lac solution.

This can be made any colour by adding a little aniline (soluble in spirit only) to colour as required.

Aqueous Decoction of Logwood

Is compounded with a solution of alum in water, in which boil logwood chips until the colouring matter is extracted, and then strain out the exhausted chips, and allow the liquor to stand and the colouring matter to settle down as a kind of mud. This precipitate must then be filtered, or evaporated to dryness, and afterwards formed into a paste by moistening with hydrochloric acid (spirit of salts), and as required for use dissolved in alcohol and thinned for dying by adding water.

Pulverised Indigo.

Dissolve indigo in four times its own weight of fuming sulphuric acid; allow the solution to stand in a warm place for a few days; and then dilute with water.

Solution of Tin.

Dissolve 50 parts of granulated tin by boiling in 50 parts of hydrochloric acid; or dissolve $33\frac{1}{3}$ parts of granulated tin, by boiling it in 50 parts of hydrochloric acid. And also $\frac{1}{8}$ to $\frac{1}{4}$ oz. each of the following salts: alum; potassium bichromate; potassium ferrocyanide; and sulphate of copper. Add the salts to the water until a part of them remains undissolved at the bottom of the vessel.

To Make a Polishing Paste for all Metals.

Take the waste product from glass cake (a refuse obtained from glass-works), 1 lb. Mix this with—

Red oxide of iron . . .	¼ oz.
Oxalic acid	1 drm.
Palm oil	½ oz.

Stains for Wood.

Blue.—Dilute a solution of indigo with a sufficient quantity of water.

Bluish Brown.—Dilute a solution of logwood with spirit of wine, and add some solution of tin. (Recipe given above for tin.)

Blue Black.—Dilute a solution of extract of logwood with spirit of wine, and add solution of sulphate of tin.

Brownish Red.—Mix a decoction of Brazil wood with some solution of tin.

Crimson.—Dilute a solution of cochineal with spirit of wine.

Greenish.—Extract of saffron, with an addition of some indigo solution.

Yellowish Grey.—Decoction of Persian berries, mixed with some solution of sulphate of iron.

Cherry Red.—Decoction of Brazil wood, with diluted spirit of wine, and then solution of tin.

Turkish Carpet Soap.

To Clean Carpets and Revive the Colours like New.

Ammonia carbonate	2 oz.
Fullers' earth	¼ oz.
Castile soap	4 oz.
Ox-gall	½ oz.

Mix all up into a paste, let it dry into a soap and use with warm water with brush, sponge or flannel.

Preparation for Hat Bodies.

Orange shellac in powder	4 lb.
Water	14 lb.
Borax	1 lb.
Ox-gall	2 oz.
Carbonate of ammonia	¼ oz.

Dissolve the borax in water by heat and sift in the powdered shellac until dissolved, stirring all the while ; afterwards add the ammonia and ox-gall ; then strain.

Flexible White Enamel for Bird-Cages and Iron Bedsteads.

Gum mastic	5 lb.
Turpentine	1 gall.
Glycerine	1 oz.

Grind the above through a paint-mill into ordinary white lead paint of any thickness wished.

A little blue may be added to suit requirements. This will make a magnificent enamel for iron-work or wood, which will dry with or without stoving and bend to an angle.

Refined Linseed Oil.

Take 120 gall. of linseed oil, and 3 lb. of oil of vitriol in a boiler, with 10 lb. quicklime, and stir to incorporate them equally, and boil for two hours. Withdraw from the fire ; let the oil stand for a few weeks to clear itself.

Sawdust Soap.

The Best Cleanser for the Hands in Use.

Take soft soap 1 lb., and mix it with a $\frac{1}{4}$ lb. of fine sawdust. Let the compo stand for a few days to harden before use.

To take Oil and Grease out of Leather or Wood.

Fullers' earth	2 oz.
Pipe-clay	2 oz.
Ammonia	½ oz.

Mix and let the compo stand until the next day, when it will be ready for use. The articles should be first washed or scoured with the compo in hot water, and afterwards well scrubbed with soft soap, or pearlash and boiling water.

To Remove Printing Ink from most Articles.

Benzole	½ pint.
Turpentine	1 pint.

NOTES UPON VEGETABLE OILS.

Boiled Oils.

No. 1. *Boiled Oils.*—Various oils are thickened by boiling in conjunction with metallic oxides, or the atmospheric air, to adapt them for use in the arts of life. They are usually treated with the following carriers of oxygen: oxide of manganese, borate of manganese, borate of lead, acetate of lead, and litharge. About 5 per cent. of any one of these preparations added in the boiling attains the object sought by the manufacturer. The oils should first be cleared of mucilaginous matter, and for this object they are usually allowed to stand in tanks for weeks or months. These oils are often, however, adulterated with resin oil, because it can be purchased for

about £6 per ton, and is therefore a great temptation to oil boilers and manufacturers. But it always retards drying, and dissolves readily with a slight heat, thus causing the compounds made with such a mixture to feel clammy. It can be easily detected, however, in the following manner, viz.: Place, say, 4 oz. of oil in an enamel oil-cup, or vessel, and heat it over a lamp up to 250° F. for half an hour, when it will throw off the resin oil with an unpleasant vapour, and its amount can be readily discovered by the deficiency in weight of the residue. Pure linseed oil boils at 600° F., attracts the oxygen and becomes heavier, and is quicker in drying. This is called "drying" oil; if boiled twice it is called "double boiled" linseed oil, and is much thicker. It matters not how pale or colourless the oil may be before boiling; it becomes darker by the continued application of heat in the boiling. There are methods of treating the oil with acids to make it a paler colour and even dry quicker, but they impoverish the lasting properties of the oil and make it brittle, and also have a tendency to rot the fabrics the oil comes in contact with.

No. 2. Pale White Oil, Ground-Nut Oil.—This is obtained from the African ground-nut, after it has been stripped of its outer coat. It gives a large percentage of pure white oil by pressure, and is highly esteemed on account of its colour and pleasant nutty flavour. With other oils and fats it is comparatively speaking low in price, and ought to be much more largely used for a variety of purposes, as it is perfectly harmless. When coloured with a small percentage of yellow aniline it is highly suited for mixing or making butter colourings, as it does not coagulate at a low temperature. It is also useful in soap-making, and will mix readily with lard or other fats. It makes a splendid substitute for olive oil, and is largely used in Gallipoli by

disreputable merchants for adulterating olive oil to reduce its cost.

No. 3. *Corn and Maize Oil.*—The use of this is comparatively new, and is highly suited for confectionery. A very small proportion, about 5 per cent., mixed with butter or margarine, will cause pastry to keep moist for a very long period.

No. 4. *Neatsfoot Oil.*—This is an excellent undrying oil, and highly useful for watch-work, bicycles, etc. Its clarification is a most important point, which can be obtained by long digestion or age, or filtering. The greater its age the more its value.

WOOD AND OTHER STAINS FOR HOUSEHOLD USE.

General Instructions for Staining.

Preparations for Staining Stones.

If alabaster, marble and other kinds of stone used in building or domestic ornamentation are to be acted on, all grease, oil or dirt should be carefully washed off, and the stone afterwards be allowed to dry for a day or two. If the colours are mixed with water, the stains used should be boiled in it, and poured on the stone boiling hot, and brushed evenly over the surface and into all carvings or letterings.

If mixed in spirits the stains should be applied cold, and allowed to soak into the pores of the stone slowly, and to settle in for a few days before being rubbed or washed.

If a dull substance is to be stained, and what is called an "art colour" is desired, the stain used should be of a brown or grey tint, which, by mixing its refraction of light with the brighter one of the stain, will produce the wished-for tone.

Bone Staining.

In bone staining the bone should *not* be polished before the stain is applied, but after it has been stained. Grease should also be removed, as in the case of stone. If, after the stain has been applied and dried in, any white specks appear, rub the bone well with fine chalk-powder or whitening, and again boil it in the hot dye. On taking the bone from the hot bath, plunge it into cold water to lie till cool, or it may crack if at once exposed to the air.

Staining Paper and Parchment.

Spread the sheets on a perfectly level table, and brush the stains over them with a broad varnish brush if you only wish to stain or varnish one side, and hang them afterwards upon a line or clothes-horse to dry.

But if desired to stain through and through, dip into the stains or dyes, not as woven fabrics are dipped, but held horizontally and carefully drawn through the liquid so as to avoid creases. To enable this to be done, the dye should be poured into a wide square tub. The sheets, when dry, can be carefully ironed to remove the "cockling" caused in the dipping and dyeing.

Staining Wood for Inlaying Work.

For inlaying, the wood should be sawn into thin planks, as for veneering, and planed and sand-papered quite smooth, and then soaked until saturated quite through by the stains. This should be done more than once.

When fully stained, dry and rub over with Dutch brushes, or well-dried hay, and wipe after so doing with a soft cloth to remove all dust or particles of the hay, and cover with seed or other lac varnish, applying one or more coats.

Special Recipes for Stains on Wood.

No. 1 *Black.*—Drop a little vitriol into a tea-cup of water, and brush over the wood with the liquid, when the wood will become a fine black, capable of taking a beautiful polish, after being held before a fire for a short time.

No. 2 *Black.*

Vinegar	½ gall.
Nut-galls (bruised)	1 oz.
Logwood chips	½ lb.
Copperas	½ lb.
Sesqui-chloride of iron	½ oz.

Boil well together, and apply hot.

No. 3 *Black.*

Vinegar	½ gall.
Lampblack	1 lb.
Iron rust (oxide of iron)	3 lb.

Apply, when boiling hot, with a brush, but let it stand for a week or ten days after boiling the first wash, and heat up again for the operation of brushing on to the wood. Not less than three coats should be applied. To finish off, rub well with boiled linseed oil, and a deep black will ensue.

No. 4 *Black, for Wood.*—A waterproof black, that resists sea or salt air.

Lampblack	1 lb.
Oxide of iron	3 lb.
Vinegar	½ gall.
Nut-galls	1 oz.
Logwood chips	½ lb.
Copperas	¼ lb.

Boil all together, and let the wash stand for a week. Clean the wood to be stained, and put on hot three coats, letting each coat dry in before the next is laid. At the end polish with a well rubbed-in coat of boiled linseed oil. This compo is useful

for the furniture or walls of the cabins of ships, as it is both water and salt proof.

No. 5 Black, Wood.

Logwood	1 lb.
Brazil wood	¼ lb.

Boil them together for an hour or two in a gallon of water. After cleaning the wooden articles to be stained, steep or brush them over with this extract, boiling hot, three or four times, to form the purple ground. Then have ready a strong liquor of nut-galls, prepared as follows :—

Nut-galls	4 oz.
Water	½ gall.

Boil, or simmer in the heat of an oven for three or four days, keeping the water replenished as it evaporates, and give two washings of this liquor, by means of a flat brush, upon the purple-stained wood, and complete your work by laying over the last wash, whilst it is still wet, a finishing dressing of the following beautifier, made as under :—

Copperas	2 oz.
Water	1 qrt.

When quite dry, cover with any transparent varnish.

No. 6 Black, Wood.

Copper chips	½ lb.
Aqua fortis (nitric acid)	1 qrt.

Allow to macerate until dissolved.

Brush over the wood with this three or four times, and allow to dry.

Then brush over with a decoction of logwood to produce an invisible green or dark black, according to the coats of logwood you apply.

No. 7 Black, Wood.

Boil as under:—

Pearlash	1 oz.
Logwood chips	½ lb.
Water	2 qrt.

Apply this to the wood with a brush, while it is hot, to form a purple ground.

Logwood	1 lb.
Verdigris	½ oz.
Copperas	½ oz.
Iron rust (oxide of iron)	½ lb.

Boil these for a couple of hours, and brush all over the purple ground, and, when all is dry, polish by oil or varnish.

Green Stain for Imitation Satin Wood.

Verdigris	1 lb.
Vinegar	1 gall.

Dissolve the two together by steeping and stirring or boiling. Paint the wood with the liquor over and over until the hue you desire is obtained. Thin down the liquor if required with hot vinegar.

N.B.—As this compo is highly poisonous it should never be made in pans used or to be used for household purposes; nor should the compo be carelessly left about amongst children or animals.

Australian Cedar Stain.

French berries (fruit of the Rhamnus infectorius)	½ lb.
Water	2 qrt.

Boil together until a deep yellow decoction is produced, and apply to your wood when boiling hot, laying two or three coats on.

To deepen the colour, if you wish it, lay a wash of logwood liquor over this yellow.

When dry, varnish.

Red Stain for Wood.

Brazil wood	1 lb.
Pearlash	1 oz.
Water	1 gall.

Boil all together, and brush well over the wood until you get your desired shade of colour.

Have ready at hand the solution hereafter given—

Water	1 qrt.
Alum	2 oz.

Boil to dissolution, and before red stain has dried wash over it the alum solution in a boiling state.

Another Red Stain.

Archil	1 lb.
Alum	4 oz.
Water	1 gall.

Dissolve in heat, and apply to the wood with a brush till attaining the tint desired.

Yellow Stain for Wood.

Take tincture of turmeric and brush over the wood, and afterwards varnish it.

Blue Stain for Wood.

Indigo	1 lb.
Woad	2 lb.
Alum	3 oz.
Water	1 gall.

Boil the whole together until a deep, rich decoction is formed, and then brush the wood until it has taken in a deep stain. To facilitate the absorption of the indigo and woad the wood to be stained should be carefully washed free from grease or oil in water tinctured by lime, by letting that water rest in a bucket in which a lump of quick-lime lies all night previously. The water to be used is only the clear liquid that can be poured off from the sediment of lime lying at the bottom.

Another Blue Stain for Wood.

Aqua fortis	¼ lb.
Copper filings	2 oz.
Water	1 qrt.

Mix, and allow to dissolve by chemical action.

Brush over the wood to be stained. Afterwards wash over by a brush with the following neutralising and developing solution:

Pearlash	4 oz.
Water	1 qrt.

To be applied boiling hot, until a deep blue colour is developed.

N.B.—The above compo is highly poisonous and somewhat dangerous to handle, both from its components and the acrid gases evolved in its production and use. Open ventilation is needed in any workshop where it is made or applied, as the gases are very destructive to the lungs and flesh tissues, but, carefully manipulated, beautiful work results from it.

Mahogany Colour Stain for Wood.

No. 1.—Madder	1 lb.
Logwood	2 oz.
Water	1 gall.

Boil for two hours and apply hot, brushing the liquor well in. Afterwards take

Pearlash	½ oz.
Water	2 qrt.

and when the article operated on as above is dry brush it over with the pearlash wash at boiling heat.

No. 2.—Dragon's blood	2 oz.
Oil of turpentine	1 qrt.

Put together in a bottle or can, and dissolve by agitation in a gentle heat (not over a fire), and use

by brushing over the surface of the wood, or by steeping the articles in the compo.

Rosewood Stain.

No. 1.—Logwood	. . . .	½ lb.
Salts of tartar	. . . .	½ oz.
Water	. . . . .	3 pints

Apply to the wood to be stained, whilst boiling hot, by means of a painter's graining-brush. Give three coats.

Afterwards, by a painter's graining-brush, form the streaks of the natural rosewood by any black stain.

No. 2.—Vinegar	. . . . .	½ gall.
Copperas	. . . . .	4 oz.
Logwood	. . . . .	8 oz.
Nut-gall (powdered)	. .	1 oz.

Boil all together for one hour, and let the extract stand in the boiler-pan for a week, and then heat again and apply to the wood.

Have ready prepared for use also the following decoction :

Vinegar	. . . . .	2 qrt.
Iron filings	. . . .	½ lb.

and brush it over the surface after having applied No. 1 stain.

Boil together, and paint on the ground priming the dark lines and flakes of natural rosewood by means of a graining-brush or comb, or a crushed reed.

Polish or varnish, as wished.

Brown-Red Wood Stain.

No. 1.—Fustic chips	. . . .	4 oz.
Madder	. . . . .	8 oz.
Water	. . . . .	1 gall.

Boil for two hours, to extract the colour.

Apply the stain hot, by a brush, for several coats

until you secure the exact tint wished, letting each coat dry before another is applied.

No. 2.—Brown-red.—Clean your wood surface from all oil or grease, and proceed as below.

Water	1 pint
Aqua fortis	½ oz.

Brush over the surface with this compo, and let it dry ; and have ready a stain made as under :

Dragon's blood	4½ oz.
Soda	1 oz.
Spirits of wine	3 pints

and digest by letting them stand in a bottle till dissolved ; then strain through a muslin, and spread over the ground colour to attain any tint you desire. Polish with oil or varnish.

Ivory and Bone Stains.

No. 1.—Red Stain, Ivory.—Steep in good red writing ink, if not intended to be afterwards used in water, or to be washed.

No. 2.—Red Stain, Ivory.—This red, if to be used on an article liable to contact with water, needs to be applied upon a mordant, or fixer, made as follows :

Aqua fortis	2 oz.
Sal-ammoniac	¼ oz.

mix ; then add

Tin, in powder	¼ oz.
Water	1 oz.

When all are dissolved, steep the ivory or bone articles in the liquor, and allow them to dry. Afterwards boil

Brazil wood	½ lb.
Water	1 gall.

and again steep your articles in it when at boiling heat.

Scarlet Stain for Ivory or Bone.

Proceed as in the red, but use solution of lac dye instead of Brazil wood.

Yellow Stain for Bone or Ivory.

No. 1.—For twenty-four hours soak your articles in a bath of strong chromate of potash, and follow that by doing the same in one of acetate of lead.

No. 2.—*Yellow, for Bone or Ivory.*—Steep in a bath of nitro-hydrochlorate of tin for two hours, and afterwards boil in a decoction of fustic chips.

No. 3.—*Yellow, for Bone or Ivory.*

Alum	1 lb.
Water	½ gall.

Boil the ivory, etc., in this wash for half an hour, and have ready the mixture made as under:

Water	1 gall.
Turmeric	½ lb.
Pearlash	1 lb.

Boil these, and on taking your articles from the first alum wash, plunge them in the turmeric one and boil for half an hour.

After that, again boil in the alum wash to fix the colour.

Violet Stain for Bone or Ivory.

Tin (in powder)	¼ oz.
Sal-ammoniac	¼ oz.
Nitric acid	2 oz.
Water	1 oz.

Dissolve all completely, and then steep your ivory or bone in the liquor, taking care not to let it touch your hands, or it will produce painful sores and discoloration. Also avoid breathing the gas evolved from the liquor.

After dipping in the above, steep the articles in a decoction of logwood.

Black Stain for Ivory or Bone.

No. 1.—Water . . . . . 1 gall.
Logwood . . . . . 1 lb.
Acetate of iron . . . ½ lb.

Soak the articles in this until the colour penetrates deeply by boiling in.

No. 2.—*Black, for Ivory or Bone.*—Dissolve lunar caustic (nitrate of silver) in water to a strong solution, and steep your articles in the solution for four or five hours, and afterwards develop the colour by exposing to the sunlight.

N.B.—Be careful not to get the solution on your hands, or it may cause sores. A pair of wooden tongs should be used to lift the articles out of the dye vat or bath.

Green Stain for Ivory or Bone.

Vinegar . . . . . 1 qrt.
Verdigris . . . . . 1 oz.

Dissolve together, and then boil your articles in it until of the desired hue.

N.B.—The vessel in which the operation is made must not afterwards be used for any household purpose, for the dye is highly poisonous, and liable to deeply penetrate any vessel in which it has been made or put.

No. 2.—*Green for Bone.*

Sulphate of indigo . . . ½ oz.
Potash . . . . . ½ oz.
Water . . . . . ½ gall.

Boil and steep the articles in the hot liquor, and afterwards dip into a solution of nitro-sulphate of tin, and follow that by one of a decoction of fustic.

Blue Stains for Ivory or Bone.

No. 1.—Boil together—

Sulphate of indigo	½ oz.
Potash	¼ oz.
Water	2 qrt.

and steep the goods in the decoction until of a deep blue.

No. 2.—*Blue Stain.*

Sulphate of copper	1 lb.
Water	2 qrt.

Boil together and steep your articles in the liquor in a boiling heat.

Staining Horn.

Any of the above recipes can be used for staining horn, as well as ivory or bone.

To make Mock Tortoiseshell.

Litharge	1 lb.
Quick-lime	1 lb.
Soda ash or potash	1 lb.

Mix in a bowl with water into a paste. The horn sheets should be steamed and pressed out smooth, and the mottles to imitate the natural marks of the real tortoiseshell painted upon them carefully with a brush, and allowed to lie upon the plates until dry. Then brush off, and if the surface is not marked enough, repeat the coat two or three times.

When ready prepared as above, the red, brown, or black mottlings are to be applied by mixing those colours in whitening and water, and painting them on in the same way as the first caustic dressing was done.

PAPER STAINS.

The following are a few of the usual methods followed in producing stains for paper and parchment.

Green Stain.

Boil—

Verdigris	1 oz.
Vinegar	1 gall.

and brush over the paper with a soft varnishing brush. When dry, apply another wash of pearlash and cold water to develop the desired green tint.

N.B.—This stain is very poisonous, so should not be made in any vessel that will be afterwards used for domestic purposes.

Blue Stain for Paper.

Indigo	1 lb.
Woad	2 lb.
Alum	3 oz.
Water	1 gall.

Boil all well together, and apply as directed for all paper or parchment stains.

This recipe produces an unfading blue.

Orange Stain for Paper.

Turmeric root	1 oz.
Spirits of wine	1 pint

and let them infuse by standing in a bottle for a few days. Strain out the coloured spirit, and brush over the paper therewith. After it has dried, wash over with a solution made as under—

Pearlash	2 oz.
Water	1 qrt.

Purple Stain for Paper, etc.

No. 1.—Boil privet berries into a jelly and press out the liquid juice, and brush it over the sheet to be stained.

No. 2.—

Brazil wood	¼ oz.
Logwood	1 lb.
Water	1 gall.

Boil together for some hours and allow to cool, and then apply to the paper or parchment by a brush.

All the above can be rendered water and damp proof by coating with one or other of the Spirit Varnishes to be found in this book.

RECEIPTS FOR DYEING WOVEN FABRICS.

The following are intended for the instruction of housewives in Britain and the Colonies, to whom a dye-house may not be a next-door neighbour, as it were, when clothing needs revival or change of colours. Our object is to give simple and clear directions, not to display the pedantry of science, although every recipe is absolutely scientific in its composition. First, we give rules for making the mordants, or the washes or drugs to fix the colours to prevent fading or washing out.

To fix reds, yellows, pinks and greens, use alum.

For blacks, browns, violets and their shades, use acetates and tartrates of iron.

For scarlet and its shades, the following mordant from tin, made as under—

Tin filings	1 oz.
Sal-ammoniac	1 oz.
Nitric acid	8 oz.
Water	¼ oz.

The water to be added after the tin and other components have been dissolved together.

Blue Dye for Cotton, Linen or Muslin.

Wash the clothes well to remove all grease, dirt or stiffenings ; dry, and then dip in a hot bath made as follows—

No. 1.—Sulphate of indigo	. . .	1 oz.
Potash	. . . . .	2 oz.
Water	. . . . .	1 gall.

After lying for twenty-four hours, wring out, and dip in a bath of alum of 2 oz. to a gallon of boiling water, and let it lie for two or three hours; then hang out to dry in the open light to develop the colour.

No. 2.—*Blue.*

Chemical blue	. . .	2 oz.
Water	. . . . .	1 gall.

Soak the fabric first in a solution of alum, dry it, and then steep it in the blue dye for twenty-four hours.

Buff Dye for Cotton and Linen.

Annatto	. . . . .	1 oz.
Water	. . . . .	3 qrt.
Potash	. . . . .	2 oz.

Boil till all are dissolved, stirring at the same time.

Put the calico, after it has been well washed as before directed, into the boiling liquor, and stir vigorously for ten minutes, then remove it and pop the fabrics into cold clean water and rinse, but do not wring them, but hang carefully on a line, or bush, and allow them to dry.

Green Dye for Cotton or Linen.

Wash the fabrics as directed above, and then boil them in alum and water; afterwards, in the following liquor:

Indigo	1 oz.
Turmeric	1 oz.
Water	1 gall.

Let the articles boil in the wash until you attain the colour you desire.

Yellow Dyes for Calico or Linen.

No. 1.

Cut off the stalks of potatoes when the plants are in flower, and bruise them and squeeze out the juice or sap. Steep the cloth in this for forty-eight hours, and then hang up to dry.

No. 2.—*Yellow.*

Boil the clothes in alum and then in a solution of annatto, turmeric, or wild dyer's herb.

Drab Dye for Calico.

Boil oak, or hemlock-wood bark in water with soda or potash in it, and afterwards boil the fabrics to be dyed for a couple of hours, or till you get the tint you require.

If copperas is added to the liquor a useful fast black is obtained by any industrious housewife, or a handy man who has settled in the Colonies, or in a village anywhere.

DYES FOR WOOLLEN FABRICS.

Black Dye for Woollens.

Copperas	2 oz.
Water	1 gall.

Boil the fabric in the liquor for ten minutes, and afterwards have ready the following dye:

Logwood chips	1 lb.
Brazil wood	¼ oz.
Madder	2 oz.

Boil together for half an hour. Strain out the chips from the liquor, and boil the fabrics for an hour in it to develop the colour. Dry in the open air, and then wash the superfluous dye out, and finally press or iron the article with a damp linen cloth between the woollen and the hot iron.

Dye for Scarlet Woollens.

Take to form the mordant:

Tin in powder	1 oz.
Muriatic acid (called popularly spirits of salts)	1 lb.

Dissolve them in a stoneware or glass vessel, or bottle, in a moderate heat.

Add, afterwards, 1 oz. of lac dye and 5 gall. of water, with 1 oz. of the above tin mordant, and boil the fabrics in the liquor for an hour. Finish by washing well in cold water, and then proceed as directed for black cloth.

Red Dye for Woollens.

First take,

Pearlash	1 oz.
Water	1 gall.

and the same proportion to each gall. of water required, and boil the fabrics in it for an hour, and then wash and dry them.

Have ready prepared a liquor composed as under:

Vinegar	½ gall.
Nut-galls bruised	1 oz.

boiled together for an hour. Then steep the cloth in

the liquor. Dry it, and then steep in an alum bath of 1 lb. of alum to 1 gall. of water.

Again dry the fabric, and have ready a decoction as follows:

Madder	¾ lb.
Water	1 gall.

in which again boil the cloth. Afterwards wash the fabric in warm water and soap to brighten the colour.

N.B.—For every lb. weight of cloth to be dyed use ¾ lb. of madder root and 1 gall. of water.

SILK DYEING RECEIPTS.

All silk fabrics should be washed perfectly clean from grease or size before being plunged in the dye, or they will not take it evenly, or, in places, not at all, and thus cause great disappointment. The following formulas, or recipes, will, we are sure, be very useful for household dyeing, or as a guide to general dyers in country towns or in the Colonies, if our instructions are carefully followed.

Dye for Blue Silk.

Boil together,

Indigo	1 lb.
Woad	2 lb.
Alum	3 oz.
Water	1 gall.

to make the colour dye.

The preparative mordants are made as under:

Copperas	1 lb.
Water	1 gall.

Boil together, and after well washing and drying the silk dip it for 10 min. in this hot bath. Wash

it in clear water, and again dip it in the second mordant, consisting of:

Prussiate of potash	½ lb.
Water	1 gall.
Vitriol	¼ oz.

boiled together; and steep the silk in it for 10 min. On removal, wash the fabric well in clear cold water, and, after drying it in the air, complete the process by soaking and boiling the articles in the blue decoction first given until the desired shade is gained. After that remove, and rinse all free dye from the fabric; dry, and carefully iron.

Black Silk Dye.

Wash the articles carefully, as before directed. Then take,

Copperas	1 lb.
Vinegar	1 gall.
Logwood chips	1 lb.
Nut-galls bruised	1 oz.

and boil to a dark black decoction. Then boil the fabric therein until the shade desired is attained. Then remove, and rinse in clear water, and dry. Press as before, spreading a damp cloth between the silk and the warm iron.

Carnation Dye for Silk.

Take,

Whole grains of wheat	1¼ lb.
Alum	1 oz.
Water	4 gall.

and boil until the wheat is reduced to a soft pulp. Then crush the mash through a fine sieve to remove the bran from the pulp; then take further:

White tartar	½ lb.
Alum	½ lb.
Madder root	3 lb.
Water	1 gall.

and boil up the whole. Strain out the solid part of the madder root, and then steep the silk in the liquor at boiling heat. Finally, wash clean in cold water, and press as directed.

Lilac Dye for Silk.

Take for every lb. of silk,

Archil	1½ lb.
Cudbear	1 oz.
Water	1 gall.

Boil for a few minutes, and then dip the fabrics in, and steep until the desired colour is apparent, then take out and rinse in cold water, and dry indoors. Mangle and press as usual.

Red Silk Dye.

Use the same composition as for red woollen cloth.

Yellow Dye for Silk.

Take,

Wheat bran	7 lb.
Alum	¾ lb.
Saltpetre	¾ lb.
Water	2 gall.

Boil these for two hours, then strain out the bran and add to the liquor

Weld dye	½ lb.

and boil the silk in the wash for two or three hours, until the fabric shows the depth of colour desired. Afterwards wash it in clear cold water, and iron with a damp cloth between the fabric and the hot metal.

Brown Dye for Silk.

Boil the fabric in a decoction of green walnut peels.

Orange-Yellow Dye for Silk.

Boil in a decoction of barberry bark, or dry onion peels.

Brown-Red Dye for Silk.

Boil oak bark in water, and afterwards boil the silk in it.

WOOL DYES FOR HOME USE.

Blue for Cheap Wools.

Take,

Logwood chips	1 lb.
Brazil wood	¼ lb.
Copperas	¼ lb.
Water	1 gall.

Boil together for a few hours, and strain out the wood chips. Then boil the wool, or woollen fabrics, in the liquor and let them dry, after washing out the superfluous dye.

Drab Dye for Wool.

Take,

Brown oxide of iron	1 lb.
Water	1 gall.

in which boil the woollen fabric, after it has been well washed to clear it from grease; and, after boiling, dip in a decoction of quercitron bark, or sumach, if a dark drab is desired. Wash and press.

Red Dye for Dyeing Wool in Grain, or in the Fleece before Spinning.

Take,

Cream of Tartar	4½ lb.
Alum	4¼ lb.
Water	4 gall.

Boil the wool in this liquor gently for two hours.

Then let the vat stand and cool, and, when cold, take out the wool and wash it in cold water.

Next take,

Madder	12 lb.
Chloride of tin	1 lb.
Water	6 gall.

infusing them in warm water for about one-half to three-quarters of an hour, and then strain the liquor through canvas and pour the dye into the boiler-vat and heat up to 100° Fahr., and add to the vat 2 oz. of alum per gall. of the dye and boil until tinged.

On removing the wool, soak it for half-an-hour in a solution of white soap and water. Let the solution be as thick as cream. Finally, wash in clear cold water and dry.

RECEIPTS FOR CLEANING AND REPAIRING.

To Clean Flowered Silks or White Satins, or Velvets.

Take,

Hard white soap	1 lb.
Gum arabic	½ oz.
Water	1 gall.

Cut the soap into thin slices, and boil up with the gum till all is dissolved into a smooth thin cream. When cool enough to bear the hand in, dip the fabrics into the liquor and wash by drawing them through the hand, as if stroking a cat—but do not rub as you would linen—until they look clean. Then rinse in water, dry them and pin out on a tablecloth, and, carefully, with a clean washed clothes-brush, raise the nap by brushing the way of the grain for velvets.

Satins should be brushed with a soft hat-brush of the finest kind.

To re-stiffen the fabric, make a size as follows :—

Take,

Best white gum arabic . .	¼ oz.
Best lump sugar . . .	1 oz.
Water	1 qrt.

and boil them till quite dissolved. Then with a perfectly clean sponge of a soft kind, or clean white flannel, rub this size carefully on the back of the fabric, and dry in a warm room.

To Clean White and Flowered Velvet or Satin without Washing.

Take stale breadcrumbs sifted fine. Mix them with a little powdered blue, and rub the fabrics well over with it by means of a soft clean flannel. Then shake, and dust off with a very soft hat-brush, or clean linen cloth.

Scour for Silk and Alpaca and Mohair Dresses.

Take,

Soft soap.	4 oz.
Honey	4 oz.
White of egg	One.
Gin, a wineglass . . .	One.

Mix by beating up with a fork, and brush into the fabric thoroughly with a stiff clean brush.

Rinse in cold water, and hang up to drain. Then iron while quite damp, spreading a linen cloth over the articles to prevent injury by the hot iron.

Cleansing Reviver for Black Woollen Clothes.

Wash the garments well with soap and warm

water, and when subsequently dried apply to the surface by a sponge or brush the following reviver :

Take,

Logwood	4 oz.
Sulphate of Iron . . .	2 oz.
Water	2 qrt.

Boil together for two hours, and bottle up for use. Apply hot and brush well in. Then hang up to dry in the open air. When dry, brush well with a hard brush to raise a nap and free from black dust.

To Remove Mildew.

To remove mildew, rub the linen well with soap first. Afterwards, rub fine powdered chalk into the fabric upon the soap. Lay it on grass, and wet the fabric by means of a watering can. Dry, and proceed as before, and afterwards wash in the usual manner, and the fungi will disappear.

RECEIPTS FOR HEALTH AND SANITATION.

Feet, Fetid, Lotion for.

Permanganate of potash . .	15 parts.
Distilled water . . .	1000 parts.

The feet to be washed twice a day with the lotion. They are then to be carefully dried, and powdered with potato starch or lycopodium.

Feet, Offensive.

Treatment.—The feet should be washed daily in cold water, and afterwards rubbed thoroughly dry ; the water may contain $\frac{1}{2}$ oz. powdered alum to the quart. Also, at least once daily, especially after

exercise, lave the feet with a solution of chlorinated lime, or—

Permanganate of potash	80 grn.
Water	1 pint.

Also, before putting on the socks or stockings, the feet should be thickly powdered, especially between the toes, with

Chlorinated lime	1 part.
Prepared chalk	1 part.
Starch powder	1 part.

Fainting.

Nothing more is necessary, ordinarily, than to lay the fainting person down in a current of air, or where the air from an open window or door will play upon his face, and he will recover in a few minutes. If in a street or other open place, persons should be prevented from crowding closely around. The clothes also may be opened and cold water sprinkled upon the face, hands and chest, and some pungent substance, as smelling salts, camphor, aromatic vinegar, etc., may be applied to the nostrils; and as soon as able to swallow, a little fresh water, or spirits and water may be given. Persons who faint easily should avoid crowded rooms and places where the air is close.

Eyelashes.—Deficient Colour.

The following preparation may be carefully applied twice daily on the external aspect of the skin near the root.

Sulphur, sublimed	1 oz.
Tincture of cantharides	1 oz.
White wax	8 oz.
Glycerine	2 oz.

Melt the wax, add the other ingredients, and stir.

Dye for the Eyelashes.—Black.

Wash the lashes in Goulard water, and afterwards apply the following with a small brush :

Sublimed sulphur	1 part.
Lard	4 parts.
Glycerine	2 parts.

Melt the lard, and mix in the glycerine and sulphur. Let it stand until cool.

Lotion for the Eyebrows.

Common salt	1 drm.
Chloride of ammonium	10 grn.
Camphor	5 grn.
Oil of rosemary	10 drops.
Rectified spirit	1 drm.
Water, to	1 oz.

Dissolve the oil and camphor in the spirit, the salts in the water, and mix.

Eye Salves.

No. 1.—Sugar of Lead	1 drm.
Red precipitate	1 drm.
Camphor	6 grn.
Fresh butter (washed)	2½ oz.
No. 2.—Verdigris (levigated)	½ drm.
Olive oil	1 fl. drm.

Triturate them together.

No. 3.—Marshall's eye cerate.

Take,

Sugar of lead	½ drm.
Calomel	1 drm.
Citrine ointment	2 drm.
Palm oil	5 drm.

Mix and triturate them together in an earthenware mortar. In excoriations of the eyelids, chronic inflammations and ulcerations, blear eyes, etc.; in each widely known to be safe.

Stye Lotion.

Camphor water	½ oz.
Muriate of morphia	1 grn.

Watery Eyes.

The eyes are tender, cannot bear a strong light, and there is an abundant secretion of tears. Treatment: If acute, that is, coming on suddenly and from some injury due to dust, etc., they should be bathed in

No. 1.—Warm water	1 part.
Poppy decoction	1 part.

Chronic cases are best treated by astringents, as—

No. 2.—Sulphate of zinc	1½ grn.
Water	1 oz.
No. 3.—Alum	2 grn.
Water	1 oz.
No. 4.—Sulphate of copper	1½ grn.
Water	1 oz.
No. 5.—Nitrate of silver	1 grn.
Water	1 oz.
No. 6.—Acetate of zinc	1½ grn.
Water	1 oz.
No. 7.—Diacetate of lead	11 grn.
Water	1 oz.

The subsequent treatment of acute cases, after the inflammation has subsided, may be similar to that of the chronic.

Rectified spirit, 1 part, and water, 8 parts, may be used as a lotion in chronic cases.

Eye Waters.

No. 1.—Distilled vinegar	1 fl. oz.
Distilled water	9 fl. oz.

Mix. In simple chronic ophthalmia, weak and blear eyes, etc.; also to remove minute particles of

lime from the eyes. One-half fl. oz. of rectified spirit or 1 fl. oz. of good brandy is often added, and improves it where there is laxness of the membranes.

No. 2.—Sulphate of zinc . . . 20 grn.
Distilled water . . . ½ pint.

Digestive Pastilles.

Bismuth subnitrate . .	20 parts.
Calcium phosphate . .	30 ,,
Sodium bicarbonate . .	10 ,,
Magnesium carbonate . .	200 ,,
Iron carbonate . . .	50 ,,
Sugar	1000 ,,

Flavour with peppermint; make into pastilles; three to twelve may be taken daily.

Carbolic Dip for Stock.

Receipt for making a carbolic dip into which stock may be plunged for killing lice and mites. Use soft soap 1 gall., heat with 30 gall. of water up to a temperature of 140°, then add 1 qrt. of crude carbolic acid; then cool down to 110° and dip the sheep or lambs; but for other animals pour it along the back, so that it runs down the sides. Great care must be taken that it is applied to the brisket, under the shoulders and thighs. For the sheep scab mites the temperature should be 120°, and the scabs should be completely broken up by a small mallet.

Disinfectants to be Employed.

1. Roll sulphur, brimstone, for fumigation.

2. Sulphate of iron, copperas, dissolved in water in the proportion of 1½ lb. to the gall.; for soil, sewers, etc.

3. Sulphate of zinc and common salt, dissolved together in water in the proportions of 4 oz. sulphate

and 2 oz. salt to the gall.; for clothing, bed linen, etc.

Note.—Carbolic acid is not included in the above list for the following reasons: It is very difficult to determine the quality of the commercial article, and the purchaser can never be certain of securing it of the proper strength; it is expensive, when of good quality, and experience has shown that it must be employed in comparatively large quantities to be of any use; it is liable by its strong odour to give a false sense of security; and it is poisonous.

Coffee Extracts, Plain. For Dispensing (Liebig's).

Pour 1 qrt. boiling water on 2 lb. of best ground coffee; allow it to stand one hour, place in a percolator; add enough water to obtain 32 fl. oz. of extract; add 2 oz. alcohol to preserve, or more alcohol if intended to keep a long time.

Coffee.

Pour upon a pound of the best fresh roasted coffee 1 qrt. of cold water, heat gently for half an hour, then let it come to a boil, cool for two hours, strain and add 4 oz. of glycerine.

PLEASANT SYRUPS.

Fluid Extract of Orange Peel.

Mr. M. Bond, in the Journal of Pharmacy, describes an improved method of preparing this extract. The process, concisely stated, is as follows:

Sweet orange peel, in moderately fine powder . .	16 oz.
Glycerine	3 fl. oz.
Alcohol	q.s.
Water	q.s.

Having mixed 14 fl. oz. alcohol with 2 fl. oz. glycerine, the peel is moistened in a Wedgwood mortar with 12 fl. oz. of this mixture. After standing 12 hours percolation is conducted in the usual manner. The percolation is finished with a mixture of 2 parts alcohol and 1 part water. Reserving the first 14 fl. oz., add 1 fl. oz. of glycerine to the remainder, evaporate to $2\frac{1}{2}$ fl. oz., which mix with the reserved portion. The author describes this preparation as possessing all the aroma of the orange peel. One fl. oz. mixed with 15 fl. oz. of syrup gives an excellent syrup aurant. quite clear. By adding to a pint of simple syrup 4 fl. drm. of the extract and a few drops of solution of citric acid, a most delicately flavoured and unfermentable syrup for mineral waters is produced.

Peach.

Oil of almonds	3 drm.
Pineapple oil	3 drm.
Tartaric acid	3 drm.
Alcohol, 80°	1½ pints.

Pineapple.

Pineapple essence	2 oz.
Citric acid	1 oz.
Alcohol, 80°	2 pints.

Raspberry.

Raspberry essence	3 drm.
Tincture of orris	¼ oz.
Citric acid	¼ oz.
Liquid carmine	15 drops.
Extract rose	¼ oz.
Alcohol, 85°	½ pint.

Rhubarb.

Sliced or bruised rhubarb	8 oz.
Rectified spirit	5 oz.
Distilled water	50 oz.

Macerate four days; strain and set to subside; decant the clear, strain, mix, and evaporate to a proper consistence over a water bath at 160° F. (71° C.).

Compound Rhubarb.

Three drm. extract rhubarb, 1 drm. extract of aloes, softened with 4 drm. water; evaporate to an extract; dry in a warm place, and powder.

Sarsaparilla Extract.

Jamaica sarsaparilla cut transversely	16 oz.
Distilled water at 160° F. (71° C.)	280 oz.
Rectified spirit . . .	1 oz.

Macerate in half the water for six hours, and decant the liquor; digest the residue in the remainder of the water for six hours more, mix the liquors, express and filter; evaporate by a water bath to 7 oz., or until it has a sp. gr. of 1·130; when cold, add the spirit.

Fire Extinguishing Agents.

Vienna Fire Extinguishing Agent.—A solution of 5 parts ferrous sulphate (copperas), 20 parts ammonium sulphate, 125 parts water.

Other Mixtures.—1. Alum, 24 per cent.; ammonium sulphate, 52 per cent.; ferrous sulphate, 4 per cent.

2. Boric acid, 16 parts, by weight; alum, 24 parts; ferrous sulphate, 20 parts; dissolve in 160 parts of water. The solution is slowly poured into a cold solution of sodium hyposulphite, 24 parts by weight; water glass, 40 parts; water, 640 parts.

3. Johnstone's.—Make a mixture of equal parts of pyrolusite (manganese dioxide), potassium chlorate, potassium nitrate. Moisten with water glass

and press into a block. Place the block in a pasteboard box. Several boxes, connected by fuses, are suspended from the ceiling of a room.

4. One of the best solutions for the extinction of incipient fires consists of crude calcium chloride, 20 parts; salt, 5 parts; dissolved in water, 75 parts. Keep at hand and apply with a hand-pump.

5. Hand Grenades for Extinguishing Fires.— Fill thin spherical bottles of blue glass with a solution of calcium chloride, sal ammoniac or borax.

6. Fire Extinguishing Powder. — Eight parts common salt, 6 parts sodium bicarbonate, 2 parts Glauber's salt, 2 parts calcium chloride, 2 parts sodium silicate.

7. Common salt, 60 per cent.; sal ammoniac, 60 per cent.; sodium bicarbonate, 80 per cent.

8. Sal ammoniac, 100 per cent.; sodium sulphate, 60 per cent.; sodium bicarbonate, 40 per cent.

Chimney Fires.

9. How to Treat a Burning Chimney. — Shut all the doors of the room, so as to prevent any current of air up the chimney, then throw a few handfuls of common fine salt upon the fire in the grate or stove. This will immediately extinguish the fire in the chimney. In the process of burning the salt muriatic acid gas is evolved, which is a good extinguisher of fire.

10. Fire Extinguishers, to Charge.—The Babcock fire extinguisher is charged with a solution of bicarbonate of soda in water and sulphuric acid in a lead bottle, which, when required, is turned over by a crank, spilling the acid into the charge of soda water. Carbonic acid gas is instantly generated, by which a pressure is obtained sufficient for throwing the whole contents of the apparatus with much force through a nozzle for fire purposes. Use, of sulphuric

acid 5 parts, bicarbonate of soda 6 parts, by weight. Other combinations are used, such as carbonate of ammonia, potash, etc. Iron can be used for the alkaline reservoirs.

11. Eight lb. carbonate of soda, 4 lb. alum, 3 lb. borax, 1 lb. carbonate of potash, and 24 lb. silicate of soda solution, are mixed together; 1½ lb. of this mixture is added to each gall. of water when required for use. The object is to cover everything with a fireproof film or deposit.

Fire Kindlers.

1. Use the cheapest resin, and add about 2 oz. of tallow to each lb. of the resin. Melt the resin first, and add the tallow. Either smear over small blocks of wood or mix with sawdust and pour into moulds made of boards, which can be knocked apart and the mass broken up.

2. Dip the wood in melted resin. The following composition is sometimes used: 60 parts melted resin and 40 parts tar, in which the wood is dipped for a moment. Or, take 1 qt. of tar and 3 lb. of resin, melt them, then cool; mix as much sawdust, with a little charcoal added, as can be worked in. Spread out on a board, and when cold break up into lumps the size of a walnut, and you will have enough kindling to last a good while.

To Make Wood Incombustible.

1. Deal boards become almost incombustible when painted over with a diluted solution of water glass or silicate of soda. The water glass is usually sold as a thick fluid, like honey. This may be thinned out with water, about six or seven times its own bulk. The water must be soft—boiled water will do—and the solution applied warm. In about twenty-four hours apply a second coat, and, perhaps, a third. Use a new brush, and wash in clean water after

using, or it will get too soft. Remove grease or fat from the boards before painting them.

2. Soak the wood in a strong solution of alum and sulphate of copper. About 1 lb. of alum and 1 lb. of sulphate of copper should be sufficient for 100 gall. of water. These substances are dissolved in a small quantity of hot water, then mixed with the water in the vessel in which the wood is to be steeped. The timber to be rendered fireproof can be kept under the liquor by stones or any other mode of sinking it. All that is required is a watertight vessel of sufficient dimensions to hold enough of the liquor to cover the timber, which should be allowed to steep for about four or five days. After this it is taken out and allowed to dry thoroughly before being used.

3. A plan of rendering the wood partially fireproof is to whitewash it two or three times.

4. The wood is twice painted over with a hot saturated solution of 1 part green vitriol and 3 parts alum. The wood, after drying, is again painted with a weak solution of green vitriol, in which pipeclay has been mixed to the consistence of ordinary paint. The coat is renewed from time to time.

5. Shingle roofs, and indeed all woodwork, may be rendered less liable to take fire from falling cinders, etc., by coating it with a wash composed of lime, salt and fine sand, or wood ashes. This compound also preserves the wood, and should be applied in the same manner as ordinary whitewash.

6. Fireproof wash for shingles, etc.—Dissolve in a barrel of hot water:

Sulphate of zinc	20 lb.
Alum	20 lb.
Caustic potash	8 lb.
Manganic oxide	8 lb.

and add

Sulphuric acid	8 lb.

Pack the shingles loosely in another tub, and fill with the liquid, holding the shingles under the mixture. Fill up the first barrel also with shingles, soak for three hours, and pile to dry, repeating until all the shingles are fireproofed. After the house is shingled, paint with oxide of iron paint, tempered with other mineral colour in boiled linseed oil, and mixed to suit the taste as to shade of colour.

Timber.—1. By Payne's process, patented in 1841, the timber is enclosed in a close iron vessel, in which a vacuum is formed. A solution of sulphate of iron is then admitted into the vessel, which instantly insinuates itself into all the pores of the wood, previously freed from air by the vacuum, and, after about a minute's exposure, impregnates its entire substance. The sulphate of iron is then withdrawn, and another solution, of muriate of lime, thrown in. The two salts then react upon each other, and form two new combinations within the substance of the wood—muriate of iron and sulphate of lime. Timber thus treated is preserved both from rot and from the attack of worms, and is perfectly incombustible.

2. Dr. Burnett's process consists in treating the timber with a solution of chloride of zinc: 1 lb. chloride of zinc to 4 gall. water. It requires to be immersed for about two days for each inch in thickness, and afterwards left to dry for a period of fourteen to ninety days. This renders the wood incombustible, but not so thoroughly as the former process. It is likewise a preservative.

3. There are many chemicals employed to render articles uninflammable, such as common salt, sulphate of ammonia, tungstate of soda, etc. The wood would require to be thoroughly dried and then saturated with one of the above salts dissolved in water. The woods least inflammable are beech,

oak, American elm, plane, and other non-resinous woods such as poplar.

4. A trial at Devonport Dockyard, ordered by the Admiralty, of the method of rendering wood uninflammable by saturating it with tungstate of soda, showed that the prepared wood is, under all circumstances, much less readily inflammable than ordinary wood; that shavings and chips of the prepared wood, although they may be made to burn, cannot be made by themselves to set fire to substantial timbers of the prepared wood; that prepared timber steadfastly resists mere flame, although it may be made to burn when acted upon continuously by great heat. The cost of preparation and the largely increased weight of the prepared wood are disadvantages to be set against these advantages.

Fleas on Dogs and Other Animals.

Soap water; carbolic acid in dilute alcoholic solution; flowers of sulphur, either used as a powder or mixed by agitation with water containing a little glycerine; dilute solutions of sulphate of magnesia; any powder or solution containing tannin, as dried sumach, tea and Persian insect powder: these are the least objectionable exterminators. A little of the carbolic solution may be mixed in with the soap water, and used as a wash or sprinkled in infected localities. Flowers of sulphur contain sulphurous acid, which is fatal to the insect, but it must not be used on or near coloured woollen fabrics, as it is liable to injure the colours. Sulphate of magnesia solution (in water) may be used as a wash. Sumach powder, etc., give excellent results. The sulphur mixture mentioned, or carbolic acid shaken up with about 20 parts of water, and sprinkled in the cellar, will soon depopulate the coal heap.

To Rid Cellars of Fleas, and to Prevent Mosquito Bites.

L. O. Howard recommends benzine. A safer method is to sprinkle the floor thickly with quicklime, or a good-sized bundle of fresh pennyroyal scattered over the floor will drive them out. If fresh pennyroyal is not obtainable, get 2 oz. oil of pennyroyal, 2 oz. oil of sassafras, 4 oz. alcohol; shake together well in a bottle and spray around with an atomiser. Substitute sweet oil for alcohol, and the mixture rubbed on the hands and face will keep off mosquitos.

Flies, to Destroy.

1. Take an infusion of quassia, 1 pint; brown sugar, 4 oz.; ground pepper, 2 oz. To be well mixed together, and put in small shallow dishes where required.

2. Black pepper (powdered), 1 drm.; brown sugar, 1 drm.; milk or cream, 2 drm. Mix, and place it on a plate or saucer where the flies are most troublesome.

3. Pour a little simple oxymel (an article to be obtained at the druggist's) into a common tumbler glass, and place in the glass a piece of cap paper, made into the shape of the upper part of a funnel, with a hole at the bottom to admit the flies. Attracted by the smell, they readily enter the trap in swarms, and by the thousands soon collected prove that they have not the wit nor the disposition to return.

4. Take some jars, mugs, or tumblers, fill them half full with soapy water; cover them as jam pots are covered with a piece of paper, either tied down or tucked under the rim. Let this paper be rubbed inside with wet sugar, molasses, honey, jam, or anything sweet; cut a small hole in the centre, large enough for a fly to enter. The flies settle on the

top, attracted by the smell of the bait; they then crawl through the hole, to feed upon the sweet beneath. Meanwhile the warmth of the weather causes the soapy water to ferment, and produces a gas which overpowers the flies, and they drop down into the vessel. Thousands may be destroyed this way, and the traps last a long time.

Fly Poison.

1. A strong solution of white arsenic (say 1 drm. to the pint) sweetened with moist sugar, molasses or honey. *Poison.*

2. Molasses, honey or moist sugar, mixed with about one-twelfth their weight of King's yellow or orpiment. Both the above are dangerous preparations, and should never be employed where there are children.

3. (Redwood) quassia chips (small), $\frac{1}{4}$ oz.; water, 1 pint; boil ten minutes, strain, and add molasses, 4 oz. Flies will drink this with avidity, and are soon destroyed by it.

4. Black pepper, 1 teaspoonful; brown sugar, 2 teaspoonfuls; cream, 4 teaspoonfuls.

5. Fly Powder. The dark grey coloured powder (so called suboxide) obtained by the free exposure of metallic arsenic to the air. Mixed with sweets, it is used to kill flies.

N.B.—The editor only admits these five receipts to warn against their use under any circumstances, as all are deadly poison, though often recommended. —Ed.

Lamp Bulbs, Incandescent, to Tint.

The following is due to Mr. Arthur S. Huey, of Minneapolis:—

1. Prepare the glass by thoroughly washing in soap and water and drying. Then dip in bath, made by beating up the whites of two eggs in $1\frac{1}{4}$ lb. or pint of water and filtering, and hang up to dry.

Dissolve the aniline colour in photographer's common collodion.

2. Red or blue aniline will form clear solutions, while the green solution will require filtering.

3. Yellow aniline forms a handsome colour, but the surface of the glass presents a frosted appearance after the application.

4. Violet and purple colours may be obtained by combining red and blue in different quantities. When the solution is ready, dip the prepared glass bulbs therein, hang up to dry, and finally pass a current through the bulb for half an hour, that the heat thus generated may harden the coating of the collodion; or place in a current of air.

5. The preparation can easily be removed with alcohol or sulphuric ether, but is not affected by water. Experience has shown that the best results are obtained by not using too much aniline. Make the colour light rather than deep, and apply two or three coats.

FRUIT PRESERVING.

When we consider how profitable and large a trade in France and the United States of America is built upon the preserving of fruit, either by boiling in sugar or by simple drying in the sun or warmed air in kilns, it is astonishing that the same industry has never been cultivated amongst us in Britain, in our farming districts especially, where large quantities of fruit are yearly left to rot during the season of ripening, because during that temporary period of glut of supplies prices cannot be obtained for it sufficient to pay the cost of gathering and the railway charges for the carriage of perishable goods to the great centres of consumption in the towns. No costly plant would be needed by any farmer or keen-witted villager who might decide to preserve his own

gooseberries, plums, rhubarb or apples, but any boiler if well cleaned could be used for the fruits intended to be boiled into jams, and for drying apples into Normandy pippins, or plums into prunes or French plums, the kiln of the village maltster, or one used for milling or stripping oats previous to grinding could be utilised, especially if the orchard-owners of a whole village clubbed to hire and keep it going during the season, on the plan of co-operative cheese-making and egg-dealing. Where neither of these exist, in a village, a farmer's brick oven, heated to a degree to dry the fruit, that is not over 80° F., can be used. The apples or plums only need to be laid in layers upon trays, or better still upon sheets of wicker-work made like the lids of white well-woven baskets, and placed in such ovens, and at the heat noted, and the oven door left open to allow the evaporating water from the fruit to escape.

When dried, but not burnt, pack the results in paper-lined boxes after they have cooled, and close down.

It is not too much to say that thousands of tons of apples and plums that are now lost to our farmers might thus be saved for use gradually throughout the year.

If by a combination of circumstances it were thought desirable to put up plant for dealing in a co-operative way with the whole product of a district of villages, it could be done at very little cost, especially in those counties such as Kent, Sussex, Worcester and Hereford, where both hops and fruits are grown as main farm produce. The hop-hoasts, or drying kilns, could be used for both purposes, and the hop hoastmen could handle the fruit charges as well as they do the hops.

Vegetables also might be dried in them for packing in tins or casks for provisioning ships in the Navy, Merchant Service, and the great passenger

steamers. These articles, to the amount of several million pounds sterling per year, are imported and used by our countrymen, while our own crops lie rotting because no one has ever thought of placing before our farmers and intelligent villagers by what simple means they could provide the same, and by delivering out their stores at all parts of the year, checkmate the railway companies at their game of extorting prohibitive carriage now imposed by them upon the unlucky farmer, who knows he must within twenty-four hours get his crop to market and sold, or lose the whole of his year's labour and outlay.

As the United States is at present the chief home of this drying trade, we add below the plans and description of plant used there.

Desiccation.—The simplest form of desiccation is by ordinary sun and wind drying, as conducted in hay-making. The next step is by radiated sun heat, as in coffee-drying ; a further advance is made by the application of artificial heat, as in hop-drying and tea-drying. The primary object in all these cases is the removal of the water mechanically present, and without whose presence fungoid growths and decay cannot exist. As a curative agent simply, the application of heat is, however, unnecessary and injurious, causing a partial destruction of the flavour, and more or less fermentative change. Research has proved that between the limits of 32° and 60° F. (0° and 15° C.) vegetable substances retain their flavour and all other qualities while giving up their moisture, no fermentative action being engendered. This has led to the adoption of the following :

Cold Blast System.—The fruit or vegetables are deprived of moisture by subjection to dried air at a low temperature. The air is compressed in a chamber containing chloride of calcium or any other compound possessing strong dehydrating qualities. Chloride of calcium is in practice probably the best,

as it so readily gives up the absorbed water on being heated. The compressed and dried air is then admitted into a chamber containing the substances to be treated. The expansion lowers its temperature somewhat, which should be maintained between 32° and 60° F. (0° and 15° C.). The substances are distributed throughout this chamber on perforated trays, so as to be fully exposed to the current of cold dry air passing through. All the moisture is thus removed, without the least detriment to the flavour, colour, and other virtues of the substance acted upon. The process has a great advantage over hot drying, both in the cost entailed and the result achieved. Fruit and vegetables thus prepared, and packed with ordinary care, remain good for an indefinite period, and resume their natural shape and dimensions when placed in water.

Masson and Gannal's Process.—Vegetables are submitted for a few minutes to steam at 70 lb. per square inch, then dried by air at 212° F. (100° C.) subjected to hydraulic pressure so as to form tablets, and, when required for use, are soaked in cold water for five hours.

Hot Air Process.—1. Great quantities of vegetables continue to be prepared by this process, which has been in use for some time by Whitehead and other well-known firms. A common method of conducting the operation is as follows: The fruit or vegetable is pared or cored, if necessary, and then finely shredded. The shreds are spread on galvanised iron wire screens in the evaporator, a three-storied chamber, through which passes a current of air heated to 240° F. (116° C.). The screens rest on endless chains, that move upwards at intervals of three to five minutes, when a fresh screen is put on below, and a finished one is taken off at the top. The evaporation is very rapid. The cores and peelings of apples, etc., are made into vinegar.

2. Another plan is by means of a vacuum pan, heated to 120° to 170° F. (49° to 77° C.). The air is dried by passage over chloride of calcium. The operation occupies twenty minutes.

Carsten's Process for Potatoes.—The potatoes are peeled and cut into disks, and are scalded by immersion in nearly boiling water. They are then dried hard in an oven. To preserve the white colour, they are treated with water acidulated with 1 per cent. of sulphuric acid. They are then washed in cold water, and dried.

Sacc's Process.—Sacc's process for preserving vegetables is as follows : The vegetables are warmed to destroy their rigidity, and are then packed in barrels and surrounded with one-fourth their weight of acetate of soda in powder, by which their moisture is absorbed. In summer the action is immediate ; but in winter it may be necessary to put the barrels into a room heated to 68° F. (20° C.). After twenty-four hours, the vegetables are removed, and kept in a dry atmosphere. For use, they are soaked in cold water for twelve hours.

SUGAR PRESERVES.

We now turn to an almost equally large trade, the making of jams on a wholesale scale, in our villages. There is no need here to explain as we did about dried fruits and vegetables upon the demand for jams. Readers may be frightened from our suggestions by the trouble of getting bottles and tins, and the soldering the same up for transit. But we do not propose that they should enter upon the business of thus preparing the jams they would produce, for the retail market or shop counter. There are large capitalists already engaged in that line. A friend of the writer in one of our tropical colonies in Africa, believed he saw a good opening for business

in preserving pineapples, oranges, guavas (native grapes), and other delicious fruits in native grown sugar, and sending them to England. He accordingly imported a large supply of tins and a tinker to close them up when filled, and consigned some £1200 worth in the said tins nicely labelled to a colonial merchant in England, who offered them to the leading firms of confectionery and jam merchants but could find no buyers. "The jams are delicious," the broker said when asking the eminent firm of C—— and B—— why they would not try a quantity.

"My friend," replied Mr. B——, the urbane managing partner, "the public are not used to having pineapple or other jams in tins from that part of the world, or with your correspondent the African planter's name on labels, and it would take ten years' coaxing and advertising to get them to try if tins would hold jams as well as jars or bottles! Why did not your planter boil his pineapples and the rest in his sugar, put them into barrels or hogsheads just as boiled, and get you to offer them in that state to us? We would then have bought as many tons as he could send, have bottled and jarred them and done a trade; but we could never do one in his tins."

Let our readers read, mark, and be instructed by the above true tale, and put their farm-made jams in casks (new and clean), by preference made with ash, beech, or sycamore staves, or if put into oak casks use those that have had sherry or spirits in them, and go to the great dealers and sell to them in bulk.

To finish our anecdote we may add that the sight of jams in tins was at that time unknown to Mr. B——, but it put a new idea into his head, and he began cautiously to try tinned jams amongst his wide connection, and as he had calculated in his shrewd business mind, after about ten years' effort he founded a trade in them which has now reached

gigantic dimensions. But that is a trifle to what will be the outcome of our suggestions to our British farmers if they once start in the path we indicate.

And so we turn to processes of sugar-preserving.

JAM MAKING.

All rotten fruit must be picked out; remove the stalks and cores carefully. Then take:

Fruit	100 lb.
White sugar	75 lb.
Salt	2 lb.
Water	5 lb.

Boil, and skim off the foam until the mass becomes a clear bright liquid with the fruit rolling in it unbroken, but completely cooked. This usually takes two or three hours, but any skilled housewife can test it by dropping a little of the jam on a cold earthenware plate to see if in cooling it shows a bright crystalline surface. When well cooked pour into casks if for wholesale dealing, or into jars, tins, or bottles if for local retail.

N.B.—Some American jam makers add to our receipt a quarter to half a pound of formic acid to prevent moulding or subsequent fermentation.

It will be noted that the sugar is the average of three-quarters of a pound to one pound weight of fruit. This proportion holds good with almost all kinds.

As soon as the contents are cool, head up, or bung up the barrel and put into a cool dry place of storage.

Below we add to this British method the American ones, which specially refer to canning for home or exporting for shop sales. But as we have said above this line it is not at all advisable for the British farmer or villagers co-operative to enter upon.

Fruit, Grain and Vegetables.—For the preservation of grain no further precautions are necessary beyond gathering it when ripe and keeping it dry.

Canning Fruit.—The Pomona 'Times' publishes the following detailed statement.

A word or two as to the philosophy or science of canning will not be amiss, for it is founded on scientific principles, and there may be many modifications in the methods of securing the results desired, so that methods may, in many instances, be modified by circumstances.

There may be said to be two causes for the fermentation and decay of fresh fruit. Everywhere in the atmosphere there are little floating germs which attach themselves to cut fruit, causing fermentation. The oxygen of the air is also ready to enter into combination and produce decay. The first of these causes the strongest influences in starting the processes of decay.

Canning checks the process, from the fact that a boiling heat kills all the germs of ferment; and, by closely sealing, no more can enter, nor can the oxygen of the air gain access to the fruit to act upon it.

It has been found that the germs will not go through a sheet of cotton batting, and fruit has been preserved by closing it pretty tight, to prevent evaporation, and wrapping the joint loosely with cotton.

Fruits are in a proper condition to can when they are fully ripe, but not soft and mushy. They can be canned at any time before they are too ripe, but at the expense of a fine appearance. Many of our canneries sacrifice quality in taste and flavour to quality in appearance. The home canner will seek the best flavour, and make the fruit look as well as he can.

Glass is, of course, best, but tin cans will keep fruit just as well, with a slight danger of the acid of the fruit dissolving a portion of the tin.

If no regard is had for fine appearance the easiest way to can is to cook the fruit in a porcelain or

graniteware kettle in small quantities, two to five cans at a time, and when cooked pour into cans and seal at once.

If the finest appearance is desired, all fruit that is peeled or cut should be at once dropped into water to keep it from discolouring. By the aid of a silver spoon or knife the pieces can be arranged in the can systematically and regularly, and the can should then be shaken down as solid as possible by gently jolting on the table. It should be filled with syrup. We leave the amount of sugar in this syrup to the taste of each person. We prefer for most fruits a good strong syrup, but all do not. The filled cans should now be placed in a boiler, with water enough to come up nearly to the neck, and covers put loosely on, and the whole brought to boil, and kept long enough to cook thoroughly. The time varies. The following table is said to be a good guide :—

Fruit.	Time for boiling.	Sugar to qt. of fruit.
Cherries	5 min.	6 oz.
Raspberries	6 ,,	4 ,,
Blackberries	6 ,,	4 ,,
Strawberries	8 ,,	8 ,,
Plums	10 ,,	10 ,,
Whortleberries	5 ,,	8 ,,
Pie plant	10 ,,	8 ,,
Sour pears (whole)	30 ,,	4 ,,
Bartlett pears (halves)	20 ,,	6 ,,
Peaches (halves)	8 ,,	4 ,,
Peaches (whole)	15 ,,	4 ,,
Pineapples (sliced)	15 ,,	6 ,,
Crab apples	25 ,,	8 ,,
Sour apples	10 ,,	5 ,,
Ripe currants	6 ,,	8 ,,
Gooseberries	8 ,,	8 ,,
Wild grapes	10 ,,	8 ,,
Quinces (sliced)	15 ,,	10 ,,
Tomatoes	20 ,,	½ teaspoonful of salt

The fruit will shrink considerably in cooking, and a few pieces should be cooked in a separate dish to fill up with if there is a chance. If this extra dish is cooked with a little more sugar than the rest it is a good idea. As soon as the cans are cooled enough, remove them from the water, take off the covers, and fill the cans as full as possible to the top with boiling hot syrup. Wipe the top and neck clean, put on the rubbers, and screw down the tops as tight as possible. Watch the rubbers carefully to see that the tops fit them well.

It is sometimes necessary to test the zinc covers of the Mason jar by placing them on a smooth, flat surface, and if the edge does not come down close all the way round it can be pressed down by rubbing it with a smooth iron.

Set the fruit away, where you can watch it, for a week, and, if you discover no fermentation, it can be put in a dark place to keep. Move it as little as possible after this. If you have any doubts about any can being perfectly sealed you can wrap the top in cotton, and it will be apt to keep as well as any. Apricots, peaches, nectarines and pears should be as ripe as possible, and still keep their shape.

If you fill glass jars with hot cooked fruit they will not break if you stand them on a wet folded cloth while filling.

Jellies are delicious, and can be made of most kinds of fruit. Currants are very nice, and a few raspberries with them give the whole a raspberry flavour. Blackberries, apricots, plums, apples, quinces and grapes, before they are fully ripe, make excellent jelly. Some small egg plums and some Verdel grapes gave us some fine jelly, very light in colour, and tart. Cook the fruit in a little water; the juice which will drain out without pressure is nicest. By straining twice through a flannel bag the juice that

comes from pressure is made about as clear and nice as any.

Quinces may be pressed gently for a portion of their juice, and the pulp mashed and rubbed through a sieve, or one of the crushers made on purpose, and, with the addition of sugar, may be made into a nice marmalade. Jellies will be lighter coloured by boiling the juice alone before adding the sugar. One will need about equal bulks of juice and dry sugar to make good jelly for use in glasses. The best cover we have ever found is melted paraffin. The glasses should be allowed to be open, or lightly covered, for a day or two, to shrink; then pour the melted paraffin on top and let it cool. The hot paraffin kills all germs of mould or ferment and keeps it air-tight. The name of the jelly may be written on the smooth surface of the paraffin when cold. It will come off as neatly as a glass cover. If you do not use paraffin, cover the top with a wax paper neatly cut to circular form, the exact size of the glass, and pressed down to the jelly. Then put on the regular cover.

Crystallised Fruit.

Syrup for the making of crystallised fruit is produced thus: Take white grain or lump sugar and dissolve it in hot water, and then boil until a few drops taken from the mass candies upon being cooled on a pottery plate or glass. The formic acid can be added and boiled in with the sugar to prevent fear of moulding.

This can be made at home very nicely. Select nice firm fruit. Cook it a little in clear water; the amount of cooking you will soon learn. Place the cooked fruit into very thick hot syrup, and let it stand for about two days; then drain off the syrup, which will now be very thin, and boil it down until

it is thick again; put in the fruit and let it heat through and stand for about four days, then repeat the process, letting it stand longer every time. When the syrup no longer gets thin remove the fruit and dry it in the sun, or in an evaporator with gentle heat. It may be rolled in granulated sugar to fully dry it, and then may be packed in boxes for use. By using the first syrup for jelly, and making up some entirely new, the process can be hastened and the fruit will dry better, but will not be of quite so good a flavour. Try it.

Fruit juices.—Formic acid is said to possess powerful preservative properties when added to acid solutions, and to be particularly suitable for adding to fruit juices. About a quarter to one-half pound weight to 100 lb. of fruit and sugar is the quantity requisite.

The Preservation of Vegetables.

These are preserved by cooking them in sealed cases, and their preservation is dependent upon the destruction of all organic germs by the heat of the boiling and the perfect exclusion of air. An example of the simplest form is the canning of tomatoes. The fruits are scalded to loosen the skin, and then dipped in sieves into water, heated by the injection of steam, for half a minute. They are then skinned and picked over, and passed into the steamer. Thence they fall into the hopper and are fed by the stuffer, a cylinder worked by a treadle, into the cans. The filling of these is adjusted by boys, and they are sealed up. The cans are then boiled for two hours, then partially cooled; the air is let out by a pin hole, and they are immediately soldered up, and the cooling is completed.

Many other vegetables are canned in a similar manner. Those which have a green colour lose it

during the operation by the destruction of the chlorophyll. The same remark applies to those dried by heat.

RECEIPTS FOR MAKING FRUIT SYRUPS.

Another extensive and profitable country industry for farmers and associated villages is the allied one of making fruit syrups, for which we append the best and most modern methods, collected from Continental and American sources; for the business is practically unknown in Britain, although the fruits grown here are well known to surpass in fine and full flavour those grown in any other part of the temperate zones.

Syrups, the Preparation of.

In the preparation of syrups, which are solutions of sugar more or less strong, according to the object for which they are used, care should be taken to employ only the best refined sugar, and either distilled or filtered rain water, as they will then be rendered much less liable to spontaneous decomposition, and become perfectly transparent without the trouble of clarifying. When, however, impure sugar is employed, clarification is always necessary. This is best done by dissolving the sugar in the water, or fruit juices, cold, and then beating up a little of the cold syrup with some white of egg and one or two ounces of cold water until the mixture froths well. This must be added to the syrup in the boiler, and, when the whole is frisked up to a good froth, heat should be applied, and the scum which forms removed from time to time with a clean skimmer. As soon as the syrup begins to simmer it must be removed from the fire and allowed to stand until it has cooled a little, when it should again be skimmed,

if necessary, and then passed through a clean flannel. By using refined sugar, however, all this trouble of clarification can be avoided.

When vegetable infusions or solutions enter into the composition of syrups they should be rendered perfectly transparent by filtration or clarification before being added to the sugar.

The proper quantity of sugar for syrups will, in general, be found to be 2 lb. avoirdupois to every pint of water or thin aqueous fluid. These proportions allow for the water that is lost by evaporation during the process, and are those best calculated to produce syrup of proper consistence and possessing good keeping qualities. They closely correspond to those recommended by Guibourt for the production of a perfect syrup, which, he says, consists of 30 parts of sugar to 16 parts of water.

Preparation of Syrups.—In discussing at some length the various pharmacopœial methods for the preparation of syrups, W. Bernhardt, in a recent contribution to the 'Deutsch-Amerikanische Apotheker Zeitung,' comes to the conclusion that, with but very few exceptions, where heat would deleteriously affect the product, dissolving the sugar by heat and raising to the boiling point is the best. To ensure the best results the author lays down these rules:

1. Employ only the best kinds of cane sugar, for the lower grades of sugar contain appreciable amounts of glucose, which inclines to fermentation. Follow closely the quantities directed in formula. Concentrated saccharine solutions resist fermentation in a much higher degree than more dilute ones. On the other hand, there will be loss from crystallisation if syrups prepared by heat are stored in a cool room, as is sometimes done.

2. Use none but absolutely clear vegetable extracts, seeing to it that after ebullition the syrup

may also be perfectly bright. The latter object may be accomplished by the customary aids, such as the addition of albumen or pure filtering paper pulp before bringing the syrup to a boil. This does not apply, of course, to naturally turbid syrup, as, for instance, syrup of almonds.

The author sets forth that even with most aromatic syrups the loss of volatile constituents can be but trifling if the process of boiling be properly conducted. The inversion of saccharose may be left out of consideration, especially when fruit acids are absent, provided the solution of the sugar be completed at a low temperature and then rapidly raised to the boiling point. Albuminous substances are frequently extracted from the raw material, which boiling will remove; all fermentative germs and fungus spores are effectually destroyed by the heat.

Finally, to ensure perfect preservation, syrups should be filled into small vials (of from two to eight ounces capacity, according to individual needs) which have been placed into boiling hot water; the vials to be immediately corked and sealed. As an extra precaution, it is as well to lay the filled and corked bottles on their sides while yet hot, and to maintain that position. A French proposition is, to fill the bottles to the brim, and, while the contents are still warm, to place on top, so as to come in contact with the syrup, a circular piece of filtering paper. A firm cover of crystallised sugar is thus obtained, well calculated to exclude all extraneous matter.—'Western Druggist.'

Strawberry Syrup.

Take

Fresh ripe strawberries . .	10 qt.
White sugar	24 lb.
Water	¼ gall.

Spread a portion of the sugar over the fruit in

layers, let it stand four or five hours, express the juice, strain, washing out the marc with water; add remainder of sugar and water, raise to the boiling point, and strain.

Use strawberries of a good flavour; do not forget that if the berries possess no flavour you cannot expect to obtain a syrup of fine flavour. Avoid also rotten berries, because, unless you do, you may be sure to find as flavour the smell of the rotten berries in your syrup. Mash the fruit in a barrel, or other suitable vessel, by means of a pounder, and leave the pulp for twelve or twenty-four hours at a temperature between 70° and 80°; stir occasionally, press, set the juice aside for one night, add for every lb. avoirdupois of juice 1 oz. avoirdupois of Cologne spirit or deodorised alcohol; mix, set aside for another night, and filter through paper.

For 1 lb. of the filtered juice take 1½ lb. of sugar, and heat to the boiling point, taking care to remove from the fire, or turn off the steam, as soon as the mixture begins to boil; remove the scum, and bottle in perfectly clean bottles, rinsed with a little Cologne spirit.

All other fruits may be made into syrups or jellies in the same way, and the danger of fermentation or moulding be arrested by using formic acid in them as detailed on p. 227.

This syrup, as well as those made by the same process, is strong enough to be mixed with two or three times its weight of simple syrup for the soda fountain.

DENTISTRY RECEIPTS.

Teeth, Cements for.

One of the most important points to attend to in filling or stopping teeth is, that each tooth

must be thoroughly cleaned out, and wiped perfectly dry, before inserting or applying the cement of whatever kind it may be. Without careful attention to this matter, the cement will not adhere, or will soon become loose, and drop out or off, and the operation prove a failure. When a defective tooth is conveniently situated, it may often be filled by the party himself by the exercise of a little skill and care, particularly if it be a hollow one with a clearly defined central cavity. When the reverse is the case, it is generally necessary that the operator should be a second party.

Odontalgic Drops, Toothache Drops. See also Odontalgic Elixir and Tinctures below.

As nearly all of these contain highly volatile ingredients, as ether, alcohol, etc., they should be kept in closely stoppered or corked bottles, and the mouth should be closed immediately on their application, and kept so for some time. As many of them contain active ingredients, care should also be taken not to swallow them.

No. 1.—Liquor of ammonia (0·880—0·885) . . . . . 1 part.
90 per cent. alcohol . . 3 or 4 parts.

A little oil of cloves or cajeput, or both, is sometimes added. Very effective if properly applied.

No. 2.—Ether . . . . . 1½ fl. drm.
Alcohol . . . . . 1½ fl. drm.
Camphor . . . . . 1 drm.

Dissolve, and add, of—

Liquor of ammonia (0·880–0·885) . . . . . ½ fl. drm.

Very serviceable.

No. 3.—Creosote . . . . . 1 drm.
90 per cent. alcohol . . 1 drm.
Oil of cloves . . . . . ½ fl. drm.

Excellent for rotten or decayed teeth.

Dr. Blake's—

No. 4.—Alum (in fine powder)	. .	1 drm.
Sweet spirits of nitre	. .	1 fl. oz.

Agitate them together occasionally for an hour. But this is a bad chemical mixture, of little value, since the alum is nearly insoluble in the intended menstruum. Sweet spirits of nitre is a name for an alcoholic solution of nitrous ether.

Boerhaave's Odontalgic—

		Troy. / Avdps.
No. 5.—Opium	. . . . .	½ drm.
Camphor (powdered)	. .	4 or 5 drm.
Oil of cloves	. . . .	2 fl. drm.
90 per cent. alcohol (strongest)		1½ fl. oz.

Agitate the mixture occasionally for a week, and, after repose, pour off the clear portion. Often serviceable, and much esteemed by some persons, as toothache drops.

Dr. Copland's—

No. 6.—Powdered opium	. . .	10 grn.
Camphor	. . . . .	10 grn.
Oil of cloves	. . . .	1 drm.
Oil of cajeput	. . . .	1 drm.
90 per cent. alcohol (strongest)		½ fl. oz.
Ether	. . . . .	½ fl. oz.

Mix, and agitate the bottle occasionally for a day or two, as the last.

7. Cottereau's. — A nearly saturated ethereal solution of camphor, to which as much of the strongest liquor of ammonia is added as can be without clouding the liquid. If the latter occurs, the addition of a few drops of alcohol will restore it. A useful remedy.

Righini's—

No. 8.—Creosote	. . . . .	5 drm.
Rectified spirit	. . .	5 fl. drm.
Tincture of cochineal (strong)		2 fl. drm.
Oil of peppermint (English)	.	½ drm.

Mix. Resembles No. 3.

Tooth Pastes for Cleansing the Teeth.

1. Carbon Tooth Paste, Dentifrice Carbonique, Opiat Carbonique, etc.—

Chippings of Turkey stone (in very fine powder)	2 oz.
Cylinder charcoal (in very fine powder)	2 oz.
Prepared chalk	2 oz.
Cochineal	1½ drm.
Cloves	1½ drm.
Honey	5 oz.
Eau de Cologne	q.s.

Mix as before. In some samples powdered pumice stone replaces the Turkey stone. Much prized by smokers, and persons with rotten teeth and foul breath; but is not fit for very frequent use.

2. Winckler's Roseate Dentifrice or Tooth Paste—

Cuttle-fish bone	1 part.
Conserve of roses (red)	3 parts.
Otto of roses (per ounce)	2 or 3 drops.

Mix as before. The otto is dissolved in a little rectified spirit before adding it to the paste, or else rubbed up with the dry cuttle-fish bone. Cleans and whitens the teeth rapidly.

3. Violet Tooth Paste—

Prepared chalk	3 oz.
Cuttle-fish bone (powdered)	2 oz.
White sugar (powdered)	2 oz.
Orris root (powdered)	1 oz.
Smalts	2 to 3 drm.
Syrup of violets (to mix)	q.s.

A fashionable tooth paste, highly esteemed for its power of cleaning the teeth, and its delicate colour and odour.

4. Ward's Tooth Paste, Zieter's Antiscorbutic Dentifrice—

Prepared chalk	2 oz.
Myrrh	½ oz.
Rhatany root	½ oz.
Cuttle-fish bone	½ oz.
Orris root	¼ oz.
Honey	3 oz. or q.s.

A very useful dentifrice in foul, spongy, and scorbutic gums, loose and rotten teeth, etc.

5. Take—

Burnt hartshorn (or prepared chalk)	3 oz.
Cuttle-fish bone	2 oz.
Orris root	1½ oz.
Armenian bole (or rose pink)	1½ oz.
Oil of cloves, or essence of ambergris or musk	15 to 20 drops.

6. Magic Tooth Paste—

White marble dust	2 oz.
Pumice stone (in impalpable powder)	1½ oz.
Rose pink	½ oz.
Honey	4 oz.
Otto of roses	7 or 8 drops.

Mix as before. A favourite nostrum for rapidly cleaning and whitening the teeth, but one not adapted for free or frequent use.

7. Soap Tooth Paste, Spanish Dentifrice—

Castile soap (air dried, in fine powder)	2 oz.
Cuttle-fish bone	2 oz.
Narbonne honey	4 or 5 oz.
Aromatics or perfume (at will)	q.s.

with or without the addition of a little 90 per cent. alcohol.

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